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EUROPEAN PATENT APPLICATION

- (1) Application number: 92303669.3
- (2) Date of filing: 23.04.92

- (51) Int. CI.⁵: **C07D 403/04**, A01N 43/54, A01N 43/58, C07D 401/04, C07D 401/14
- (30) Priority: 24.04.91 US 690744
- (43) Date of publication of application: 25.11.92 Bulletin 92/48
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- (4) Fungicidal pyrazoles, pyrazolines and tetrahydropyridazines.
- (57) Fungicidal compounds useful e.g. for plant protection have the formula:









I

II

III

IV

$$R^{1}$$
 N
 R^{23}
 R^{2}
 R^{2}
 R^{2}
 R^{2}
 R^{2}

V

wherein:

A is a heterocyclic group;
G is optionally substituted quinazolinyl;
E is H; halogen, or an organic group;
n is 1, 2 or 3
R¹ is H, halogen, cyano or an organic group;
R² is H, cyano or an organic group; and
R²³ is H or an organic group.

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Atty. Docket No. 3015/6/US Serial No. 10/021,780 Anantanarayan et al. Reference 47 of 77

FIELD OF THE INVENTION

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The present invention relates to novel fungicides, their salts and metal complexes thereof, processes for their production, fungicidal compositions containing them, and a fungicidal method for applying them.

BACKGROUND OF THE INVENTION

New fungicides for controlling fungus growth on vegetation are in constant demand. In the most common situation, such compounds are sought to selectively control fungus growth on useful crops such as cotton, rice, corn, wheat and soybeans, to name a few. Unchecked fungus growth in such crops can cause significant losses, reducing profit to the farmer and increasing costs to the consumer. There are many products commercially available for these purposes, but the search continues for products which are more effective, less costly and environmentally safe.

A number of fungicides have been developed and employed. For example, U.S. 3,920,646 discloses the compound

as an anti-inflammatory agent.

Konishi et al. (J. Pest. Sci. 1990, 15, 13-22) disclose fungicidal pyazolylpyrimidines of the formula

$$\begin{array}{c|c} R_2 & R_3 & R_4 \\ \hline R_1 & N & N & R_5 \\ \hline \end{array}$$

wherein R_1 - R_6 are H, alkyl, aryl or alkenyl. Alkyl substitution enhanced the fungicidal activity in both pyrazole and pyrimidine rings. The activity was impaired by introduction of a phenyl group on the pyrazole ring.

SUMMARY OF THE INVENTION

This invention pertains to compounds of Formulae I, II, IV, V, or VI including all geometric and stereoisomers, their salts, metal complexes thereof and agricultural compositions containing them and their use as fungicides.

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$$R^{2}$$
 R^{2}
 R^{2}

wherein:

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A is 2-pyrimidinyl, 2-pyridyl, 2-quinolinyl, 2-quinazolinyl, 1-isoquinolinyl or 3 isoquinolinyl each optionally substituted with R³, R⁴ and R¹8; or s-triazinyl optionally substituted with R³ and R⁴; provided that R³, R⁴ and R¹8 only substitute carbon atoms of the heterocycles;

G is 2-quinazolinyl optionally substituted with R3, R4 and R18;

 $^{\prime}$ E is H; halogen; C_1 - C_6 alkyl; C_3 - C_7 cycloalkyl optionally substituted with 1-2 methyl; C_1 - C_6 haloalkyl; C_1 - C_6 alkylthio; C_1 - C_6 alkoyxy, C_1 - C_6 haloalkoxy; or phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, 2-naphthalenyl, furanyl or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

n is 1, 2 or 3;

 R^1 is H; halogen; cyano; hydroxy, C_1 - C_4 alkoxy, $-OC(=O)R^{19}$, $-OC(=O)NHR^{20}$ C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_6 alkoxyalkyl; C_2 - C_4 alkynyl; C_2 - C_6 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

R2 is H, cyano, C1-C4 alkyl or C1-C4 haloalkyl;

 R^3 , R^4 and R^{18} are independently halogen; cyano; hydroxy; $(C_1-C_4$ alkyl)₃silylmethyl; phenyl optionally substituted with R^{21} ; C_1-C_6 alkyl; cyclopropyl; C_1-C_6 haloalkyl; C_1-C_6 alkylthio; C_2-C_4 alkenyl; C_2-C_4 alkynyl; C_1-C_4 alkoxy; C_1-C_4 haloalkoxy; C_2-C_4 alkenyloxy; C_2-C_4 alkoxyalkyl; $R^{11}R^{12}$; or when R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} substitute adjacent carbon atoms, then R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} may together be $-(CH_2)_{3^2}$ or $-(CH_2)_4$ each optionally substituted with 1-2 methyl;

 R^5 and R^6 are independently halogen; cyano; nitro; hydroxy, hydroxycarbonyl; C_1 - C_6 alkyl; C_3 - C_6 cycloalkyl, C_1 - C_6 haloalkyl; C_1 - C_4 alkylthio; C_1 - C_4 alkylsulfinyl; C_1 - C_4 alkylsulfonyl; C_1 - C_4 alkylylyl; C_2 - C_6 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_4 alkenyloxy; C_2 - C_4 alkoxyalkyl; C_2 - C_4 alkoxyalkyl; C_2 - C_6 alkoxyalkoxy; C_3 - C_6

R⁶, R⁷, R⁹, R¹⁰, R¹⁷, R²¹, R²², and R²⁴ are independently halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy or C₁-C₄ haloalkoxy;

R¹¹, R¹², R¹³, R¹⁴, R¹⁵, R¹⁶ are independently H; C₁-C₂ alkyl; or R¹¹ and R¹², R¹³ and R¹⁴ or R¹⁵ and R¹⁶ can be taken together with the nitrogen to which they attached to form a morpholino, pyrrolidino or piperidino group.

R19 and R25 are H or C1-C3 alkyl;

R20 and R26 are C1-C4 alkyl; or phenyl optionally substituted with R22;

 R^{23} is H, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₅ alkylcarbonyl, phenylcarbonyl optionally substituted with R^{24} , C₃-C₄ alkynyl, C₁-C₄ alkynyl, phenylmethyl optionally substituted with R^{24} on the phenyl ring. C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfinyl, phenylsulfinyl, phenylsulfinyl, phenylsulfinyl optionally substituted with R^{24} , phenylsulfinyl optionally substituted with R^{24} , C₂-C₄ alkoxycarbonyl, phenoxycarbonyl optionally substituted with R^{24} , C (=O) NR²⁵R²⁶, C(=S) NHR²⁶ P (=S) (OR²⁶)₂, P(=O) (OR²⁶)₂, or S (=O)₂NR²⁶R²⁶;

provided that

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i) when E is halogen, C_1 - C_0 alkyithio, C_1 - C_0 alkoxy, C_1 - C_0 haloalkoxy, phenoxy, phenyithio or phenyiamino, then E may only substitute compounds of Formula I and III;

ii) for compounds of Formula I, when A is 2-pyridyl, n is 2, and R^1 and R^2 are H, then E is not phenyl substituted with 1 to 2 fluorine, chlorine, trifluoromethyl, C_1 – C_4 alkyl, C_1 – C_4 alkoxy, or E is not thienyl or furanyl; iii) for compounds of Formula III, either E is phenyl, phenoxy, phenylthio, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, furanyl, pyridyl each optionally substituted with R^5 , R^6 and R^7 ; or R^1 is phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^6 , R^9 and R^{10} ; and R^1 must be in the 4-position;

iv) for compounds of Formula III, R5 is not NR13R14;

v) for compounds of Formulae I and II, when n is 1, R¹ and R² do not occupy the 5-position of the pyrazoline ring;

vi) for compounds of Formula I, when A is s-triazinyl, then R3 or R4 are not NH2;

vii) for compounds of Formula I, when A is 2-pyridyl optionally substituted with R³, R¹³ and R⁴, and n is 1, then E is not phenylamino optionally substituted with R⁵, R⁵ and R⁻;

viii) for compounds of Formulae I and III, when A is 2-pyridyl, n is 1, and R¹ and R² are H, then E is not phenyl, 9-bromophenyl, 4-methoxyphenyl, 4-nitrophenyl or 4-hydroxyphenyl;

ix) for compounds of Formula II, when n is 3, E is not H or C1-C5 alkyl;

x) for compounds of Formula II, when n is 1, then E is not H;

20 xi) for compounds of Formula I, when n is 1, and A is 6-methoxypyridine, then E is not 4-N,N-diethylaminophenyl;

xii) for compounds of Formula II, when A is 2-pyridyl, n is 2, and R^1 and R^2 are H, then E is not C_1 - C_4 alkyl or pyridyl.

Preferred for reasons of greatest fungicidal activity and/or ease of synthesis are

1. Compounds of Formula I and V wherein:

A is 2-pyrimidinyl or 2-quinazolinyl optionally substituted with R3, R4 and R18; and

 R^1 is H; hydroxy, C_1 - C_4 alkoxy, C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkynyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

 R^3 , R^4 and R^{18} are independently halogen, C_1 - C_4 alkyl, cyclopropyl, C_1 - C_4 haloalkyl, allyl, C_2 - C_3 alkynyl, C_1 - C_4 alkoxy or C_1 - C_4 haloalkoxy;

R²³ is H, C(=O)NHR²⁸, or C₂-C₄ alkoxycarbonyl;

and metal complexes thereof.

2. Compounds of Preferred 1 wherein:

A is 2-pyrimidinyl optionally substituted with R3, R4 and R18;

n is 1 or 2:

E is phenyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, thienyl, or pyridyl each optionally substituted with R⁵, R⁶ and R⁷;

R1 is H; hydroxy, C1-C4 alkoxy, or C1-C4 alkyl;

R⁵ is halogen; cyano; C₁-C₄ alkyl; C₁-C₄ haloalkyl; allyl; propargyl; C₁-C₄ alkoxy; C₁-C₄ haloalkoxy; or phenoxy each optionally substituted with R¹⁷; and

 R^6 , R^7 , R^9 , R^{10} and R^{17} are independently H, F, Cl, methyl, trifluoromethyl, methoxy or trifluoromethoxy;

and metal complexes thereof.

3. Compounds of Preferred 2 wherein

E is phenyl, indanyl or tetrahydronaphthalenyl each optionally substituted with R^5 , R^6 and R^7 ; and R^2 is H or C_1 - C_4 alkyl.

and metal complexes thereof

Specifically preferred for greatest fungicidal activity and/or ease of synthesis are:

1-(4,6-dimethyl-2-pyrimidinyl)-3-(3,4-dimethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-3-(4-ethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-methylphenyl)pyridazine; 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-(1-methylethyl)phenyl)pyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-4-ethyl-1,4,5,6-tetrahydro-3-phenylpyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-4-methyl-3-phenylpyridazine.

This invention further comprises a method for controlling fungus disease in plants comprising applying to the locus to be protected an effective amount of a compound of Formulae I, II, III, IV, V or VI wherein:

A and G are 2-pyrimidinyl, 2-pyridyl, 2-quinolinyl, 2-quinazolinyl, 1-isoquinolinyl or 3 isoquinolinyl each

optionally substituted with R³, R⁴ and R¹⁵; or s-triazinyl optionally substituted with R³ and R⁴; provided that R³, R⁴ and R¹⁵ only substitute carbon atoms of the heterocycles;

E is H; halogen; C_1 - C_6 alkyl; C_3 - C_7 cycloalkyl optionally substituted with 1-2 methyl; C_1 - C_6 haloalkyl; C_1 - C_6 alkylthio; C_1 - C_6 alkoxy; C_1 - C_6 haloalkoxy; or phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, 2-naphthalenyl, furanyl or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

n is 1, 2 or 3;

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 R^1 is H; halogen; cyano; hydroxy, C_1 – C_4 alkoxy, $-OC(=O)R^{19}$, $-OC(=O)NHR^{20}$ C_1 – C_4 alkyl; C_1 – C_4 haloalkyl; C_2 – C_3 alkylcarbonyl; C_2 – C_4 alkenyl; C_2 – C_6 alkoxyalkyl; C_2 – C_6 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} :

R2 is H, cyano, C1-C4 alkyl or C1-C4 haloalkyl;

 R^3 , R^4 and R^{18} are independently halogen; cyano; hydroxy; $(C_1-C_4$ alkyl) $_3$ silylmethyl; phenyl optionally substituted with R^{21} ; C_1-C_6 alkyl; cyclopropyl; C_1-C_6 haloalkyl; C_1-C_6 alkylthio; C_2-C_4 alkenyl; C_2-C_4 alkynyl; C_1-C_4 alkoxy; C_1-C_4 haloalkoxy; C_2-C_4 alkenyloxy; C_2-C_4 alkoxyalkyl; $NR^{11}R^{12}$; or when R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} substitute adjacent carbon atoms, then R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} may together be $_1CH_2)_3-$ or $_1CH_2)_4-$ each optionally substituted with $_1C_1$ methyl;

R⁵ and R⁵ are independently halogen; cyano; nitro; hydroxy, hydroxycarbonyl; C₁-C₆ alkyl; C₃-C₆ cycloalkyl, C₁-C₆ haloalkyl; C₁-C₄ alkylthio; C₁-C₄ alkylsulfinyl; C₁-C₄ alkylsulfonyl; (C₁-C₄ alkyly)₃silyl; C₂-C₅ alkylcarbonyl; C₂-C₄ alkenyl; C₂-C₄ alkenyl; C₂-C₄ alkynyloxy; C₁-C₄ alkoxy; C₁-C₄ alkoxy; C₁-C₄ alkoxy; C₂-C₄ alkoxyalkyl; C₂-C₅ alkoxycarbonyl; C₂-C₄ alkoxyalkoxy; NR¹³R¹⁴; C(=O)NR¹⁵R¹⁶; or phenyl, phenoxy or phenylthio each optionally substituted with R¹⁷;

 R^6 , R^7 , R^9 , R^{10} , R^{17} , R^{21} , R^{22} , and R^{24} are independently halogen, C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, C_1 - C_4 alkoxy or C_1 - C_4 haloalkoxy;

R¹¹, R¹², R¹³, R¹⁴, R¹⁵, R¹⁸ are independently H; C₁-C₂ alkyl; or R¹¹ and R¹², R¹³ and R¹⁴ or R¹⁵ and R¹⁸ can be taken together with the nitrogen to which they attached to form a morpholino, pyrrolidino or piperidino group;

R¹⁹ and R²⁵ are H or C₁-C₃ alkyl;

R²⁰ and R²⁸ are C₁-C₄ alkyl; or phenyl optionally substituted with R²²; and

 R^{23} is H, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₅ alkylcarbonyl, phenylcarbonyl optionally substituted with R^{24} , C₃-C₄ alkenyl, C₃-C₄ alkynyl, phenylmethyl optionally substituted with R^{24} on the phenyl ring. C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfinyl, phenylsulfinyl, phenylsulfinyl, phenylsulfinyl, phenylsulfinyl optionally substituted with R^{24} , phenylsulfonyl optionally substituted with R^{24} , C₂-C₄ alkoxycarbonyl, phenoxycarbonyl optionally substituted with R^{24} , C(=O)NR²⁵R²⁶, C(=S)NHR²⁶ P(=S)(OR²⁶)₂, P(=O)(OR²⁶)₂, or S(=O)₂NR²⁵R²⁶;

or their agriculturally suitable salts or metal complexes thereof;

provided that

i) when E is halogen, C_1 - C_6 alkylthio, C_1 - C_6 alkoxy, C_1 - C_6 haloalkoxy, phenoxy, phenylthio or phenylamino, then E may only substitute compounds of Formula I and III;

ii) for compounds of Formula III, either E is phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, 1-naph-thalenyl, 2-naphthalenyl, thienyl, furanyl, pyridyl each optionally substituted with R⁵, R⁸ and R⁷; or R¹ is phenyl, benzyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R⁸, R⁹ and R¹⁰; and R¹ must be in the 4-position; and

iii) for compounds of Formula I, when E is H, n is 1, R¹ is 5-methyl, and R² is H, then A is not s-triazinyl optionally substituted with R³ and R⁴.

PREFERRED METHODS

Preferred for reasons of greatest fungicidal activity and/or ease of synthesis are

1. Methods employing compounds of Formula I and V and metal complexes thereof wherein:

A and G are 2-pyrimidinyl or 2-quinazolinyl optionally substituted with R3, R4 and R18; and

 R^1 is H; hydroxy, C_1 - C_4 alkoxy, C_1 - C_4 alkoyt; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkonyl; C_2 - C_4 alkoyyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

 R^3 , R^4 and R^{18} are independently halogen, C_1 - C_4 alkyl, cyclopropyl, C_1 - C_4 haloalkyl, allyl, C_2 - C_3 alkynyl, C_1 - C_4 alkoxy or C_1 - C_4 haloalkoxy; and

R²³ is H, C(=O)NHR²⁸, or C₂-C₄ alkoxycarbonyl.

2. A method according to Preferred 1 wherein:

A is 2-pyrimidinyl optionally substituted with R3, R4 and R18;

n is 1 or 2;

E is phenyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, thienyl, or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

R1 is H; hydroxy, C1-C4 alkoxy, or C1-C4 alkyl;

R⁵ is halogen; cyano; C₁-C₄ alkyl; C₁-C₄ haloalkyl; allyl; propargyl; C₁-C₄ alkoxy; C₁-C₄ haloalkoxy; or phenoxy each optionally substituted with R¹⁷; and

R⁸, R⁷, R⁹, R¹⁰ and R¹⁷ are independently H, F, Cl, methyl, trifluoromethyl, methoxy or trifluoromethoxy.

3. A method according to Preferred 2 wherein

E is phenyl, indanyl or tetrahydronaphthalenyl each optionally substituted with R^5 , R^6 and R^7 ; and R^2 is H or C_1 - C_4 alkyl.

Specifically preferred for greatest fungicidal activity and/or ease of synthesis are methods employing:

1-(4,6-dimethyl-2-pyrimidinyl)-3-(3,4-dimethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-3-(4-ethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-methylphenyl)pyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-(1-methylethyl)phenyl)pyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-4-ethyl-1,4,5,6-tetrahydro-3-phenylpyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-4-methyl-3-phenylpyridazine.

DETAILED DESCRIPTION OF THE INVENTION

Synthesis

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Compounds of Formula I where E is as described previously with the exception of halogen, phenoxy, phenylthio, phenylamino, C_1 - C_6 alkoxy, C_1 - C_6 alkylthio and C_1 - C_6 haloalkoxy, and R¹ and R² are as described previously, can be prepared by one or more of the methods described in Equations 1 to 14.

As shown in Equation 1 below, compounds of Formula Ia can be prepared by deprotonation of compounds of Formula Ib with a strong base such as lithium diisopropyl amide (LDA) followed by addition of R²-L where L is a leaving group such as Cl, Br, I, OSO₂CH₃ or OSO₂C₆H₄CH₃. The reaction is carried out at about -78° to about 100°C in an inert, aprotic solvent such as tetrahydrofuran (THF) or dimethoxyethane (DME).

Equation 1

Compounds of Formula Ib can be prepared by reacting hydrazine 1 with 2 as shown below in Equation 2.

The reaction is carried out at about 50° to about 100°C in a lower alcohol solvent such as ethanol or 2-propanal.

Equation 2

A base such as sodium hydroxide is added if necessary. The hydrazines 1 can be prepared by treating a compound of Formula 3 with hydrazine monohydrate as taught in EP293743-A and by Naito et al. (Chem. Pharm. Buil. 1969, 17, 1467-1478). Compounds of Formula 2 are either commercially available or can be prepared by methods described in Carey, F.A.; Sundberg, R.J. Advanced Organic Chemistry; plenum:New York, 1983; Part B, pp. 58-62:

X = C1, SH

Compounds of Formulae Ic, Id and le can be prepared by reacting $\underline{1}$ with α,β -unsaturated ketones $\underline{4}$, $\underline{5}$ or $\underline{6}$ as shown below in Equations 3, 4 and 5. The reaction is carried out at 50°C to 100°C in a lower alcohol solvent such as ethanol or 2-propanol in the presence of a catalytic amount of an acid, such as hydrochloric acid. Compounds of Formulae $\underline{4}$, $\underline{5}$ and $\underline{6}$ are well known in the literature and can be prepared by methods known to one skilled in the art.

Equation 3

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$$\underline{I} + R^2 \longrightarrow_{R^1} \stackrel{O}{\longrightarrow}_{E} \longrightarrow_{R^1} \stackrel{A}{\longrightarrow}_{R^1} \stackrel{A}{\longrightarrow}_{E}$$

Equation 4

Equation 5

As shown below in Equation 6, compounds of Formula If can be prepared from compounds of Formula Ig according to the procedure described previously for Formula Ib.

Equation 6

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Ιg .If

Compounds of Formula Ig can be prepared by reacting 1 and 7 as shown below in Equation 7. The reaction is carried out at 25° to 100°C in an organic solvent such as ethanol, 2-propanol, acetonitrile or N,N-dimethylformamide in the presence of a catalytic amount of an acid such as toluenesulfonic acid and a drying agent such as molecular sieves (3Å). This reaction can also be carried out in two steps. The first step involves the formation of the hydrazone from ketone 7 and hydrazine 1 in an organic solvent such as acetic acid or acetonitrile. The hydrazone product is isolated and dissolved in an inert solvent such as THF. Treatment with sodium hydride provides Ig. If acetonitrile is used as the solvent, potassium carbonate can be used as the base instead of sodium hydride.

Equation 7

HN

Compounds of Formula $\underline{7}$ can be prepared from keto esters $\underline{8}$ and ethylene oxide using the general method described by Cannon et al. (Org. Syn., Coll. Vol. IV, 1963, 597-600).

> нх X = C1, Br

Compounds of Formula $\underline{7a}$, wherein E is an aromatic group optionally substituted with R^5 , R^6 and R^7 , and

R¹ is H, alkyl, halogen, or haloalkyl, can be prepared by Friedel-Crafts acylation of the parent compound E-H with an R¹-substituted 4-chlorobutyryl chloride according to the procedure set out in the literature (for example, see Close; <u>J. Am. Chem. Soc.</u>, **1957**, 79, 1455) and illustrated below.

The corresponding chlorobutyryl chloride can be prepared by reacting γ -butyrolactone with thionyl chloride in the presence of zinc chloride according to the procedure taught by Goel et al. (Synthesis, 1973, 538; see Equation below).

$$R^1$$
 O + $SOC1_2$ + $ZnC1_2$ $C1$ $C1$

Compounds of Formula $\underline{7a}$ can also be prepared by condensing γ -butyrolactone with an ester followed by alkylation with R¹X and treatment of the alkylated product with hydrochloric acid.

OR + OR
$$\frac{1}{2}$$
 NaOR $\frac{1}{2}$ RotBu, $R^{1}I$ $\frac{1}{R^{1}}$ $\frac{1}{R^{1}}$ $\frac{1}{R^{1}}$ $\frac{1}{R^{1}}$

Similarly, compounds of Formulae Ih, li, lj, and lk can be prepared by the same method from the corresponding keto esters and oxiranes as shown below in Equations 8, 9 and 10. The stereoisomers obtained in the reactions can be separated by chromatography.

Equation 8

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Equation 9

Equation 10

Methods to prepare β-keto esters and oxiranes are well known in the literature and can be prepared by methods known to one skilled in the art. For example, keto esters 8 can be prepared by treating ketones of Formula 9 with a base such as sodium hydride in an aprotic solvent such as DMF followed by addition of diethyl carbonate.

Compounds of Formula Ij and Ik can also be prepared using malonate as the starting material as shown below in Equation 11. The intermediate lactones 10 and 11 are condensed with an ester ECOOR, decarboxy-lated and cyclized with hydrazine 1 to form Ij and Ik.

Equation 11

As shown below in Equation 12, compounds of Formula In can be prepared by standard alkylation of compounds of Formula Io with R^2 L as described previously.

Equation 12

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Compounds of Formula Io are prepared from 1 and bromoketone 12 as shown below in Equation 13 according to the method described for the preparation of compounds of Formula 1b. Methods to prepare compounds of Formula 12 are well known to one skilled in the art.

Equation 13

Br
$$E + 1$$
 To

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Those skilled in the art will recognize that compounds of Formula Ip can be prepared from appropriately substituted bromoketones by the same method described above.

Ιp

Compounds of Formula II can be prepared by one or more of the methods shown below in Equations 14, and 16

As shown in Equation 14, compounds of Formula IIa, a subset of Formula II, can be prepared by reacting hydrazine 13 and α,β -unsaturated ketone 14. The reaction is carried out at 50° to 100°C in a lower alcohol solvent such as ethanol or 2-propanol in the presence of an acid catalyst such as hydrochloric acid.

Equation 14

$$\begin{array}{c} 0 \\ R^{1} \\ R^{2} + ENHNH_{2} \\ \\ \hline \\ \frac{13}{R^{2}} \\ \end{array}$$

14

IIa

As shown in Equation 15, compounds of Formula IIb, where R¹ and R² are substituted at different carbons, can be prepared by reacting compounds of Formula 13 with ketone 15a or 15b according to the method described for Formula IIa.

Equation 15

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As shown in Equation 16, compounds of Formula IIc can be prepared from compounds of Formula $\underline{13}$ and ketone $\underline{16}$ according to the procedure described for Formula IIa. Deprotonation of Formula IIc with a base such as LDA followed by alkylation with R^2 -L provides compounds of Formula IId.

Equation 16

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Methods to prepare ketones 14, 15a, 15b and 16 from ketone 17 and carbonyl compounds of Formula 18 are well known to one skilled in the art.

z = H, R^1 , or R^2

Methods to prepare heteroaryl carbonyl compound 17 and carbonyl compound 18 are well known to one skilled in the art.

Compounds of Formula II where n=2 (IIe) and n=3 (IIf) are prepared by a variety of methods described for compounds of Formulae If to Ip.

The appropriate starting ketones, epoxides, bromoketones and alkenes can be prepared by one skilled in

Pyrazoles of Formula III can be prepared as shown below in Equation 17 from a pyrazole salt 19a such as the sodium salt, with a heterocycle 20 containing an activated leaving group such as a halogen in an organic solvent such as THF. This method allows the preparation of pyrazoles III with large substituents E in the 3-

The salt 19a is prepared from the pyrazole 19b and an organometallic such as sodium hydride.

Equation 17

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Pyrazoles of the Formula IIIa also may be prepared from dicarbonyl compounds. As set forth below in Equation 18, keto aldehydes such as 21 can be condensed with a heterocyclic hydrazine 1a in an alcoholic solvent such as ethanol with an acid to provide pyrazoles as a mixture of 3,4- and 4,5-isomers which can be separated

by chromatography.

The reaction of diketones 22 as set forth in Equation 19 below, under the same conditions, gives pyrazoles 23 as a mixture of isomers which can be separated by chromatography. 35

Equation 19

Equation 13
$$R \longrightarrow R^{2} \longrightarrow R^{2$$

Pyrazoles $\underline{24}$ also may be prepared by heating a mixture of keto aldehydes such as $\underline{21}$ and hydrazine in an alcoholic solvent such as ethanol with a trace of an acid catalyst such as hydrochloric acid as shown below in Equation 20.

Equation 20

$$21 + NH_2NH_2 \longrightarrow N$$

$$H$$

$$24$$

The reaction of diketones 22 with hydrazine under the same conditions, as shown in Equation 21 below, gives pyrazoles 25 as a mixture of isomers.

Equation 21

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Several other methods to prepare pyrazoles are described in the literature (Kost, A.N.; Grandberg, I.I., Advan. Heterocycl. Chem. 1966, 6, 347-429).

When A=G, compounds of Formula III can also prepared by oxidation of compounds of Formulae Ic and Id with nickel peroxide (NiO2) or manganese dioxide (MnO2) as shown below in Equation 22 according to the procedure taught by Evans et al. (J. Org. Chem. 1979, 44, 497-501).

Equation 22

When A=G compounds of Formula IV, as shown below in Equation 23 are similarly prepared by oxidation of Ilb with nickel peroxide.

Equation 23

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Compounds of Formula Va, a subset of V wherein R²³ is H, can be prepared by reduction of compounds of Formula I with sodium borohydride/titanium (IV) chloride according to the procedure taught by Kano et. al. (Synthesis, 1980, 695) as set forth in Equation 24. One skilled in the art will recognize that some substituents in Compounds of Formula I are not compatible with the reduction conditions and therefore protection and deprotection techniques are necessary in these cases.

Equation 24

Compounds of Formula Vb wherein R^{27} is C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, optionally substituted phenylmethyl, C_3 - C_4 alkenyl, or C_3 - C_4 alkynyl, can be prepared by treating compounds of Formula Va with the appropriate alkylating agent of Formula 26 as set forth in Equation 25 below.

Equation 25

The leaving group X in the compound of Formula 26 may be a halogen, acetate or another molety used by those skilled in the art for alkylating. Iodine and bromine are commonly used leaving groups X.

The compounds of Formula Va are dissolved in an inert solvent such as methylene chloride, tetrahydrofuran (THF) or benzene and treated with the compound of Formula 26 and a base at a temperature ranging from 0° to 100°C. Triethylamine, N,N-diisopropylethylamine, and other tertiary-amine bases are preferred.

The product of Formula Vb can be isolated by evaporation of the solvent, dissolving the residue in a water immiscible solvent such as ether. This solution may be washed with dilute aqueous mineral acid, water, and brine, and dried. Evaporation of the solvent followed by crystallization or chromatography affords the purified product.

Compounds of Formula Vc where R^{28} is C_1 - C_4 alkylsulfinyl, optionally-substituted phenylsulfinyl, C_1 - C_4 alkylsulfonyl, optionally substituted phenylsulfonyl, C_1 - C_4 alkylsulfonyl, optionally substituted phenyl carbonyl, $C(=O)NR^{25}R^{26}$, $P(=S)(OR^{28})_2$, $P(=O)(OR^{26})_2$, or $S(O)_2NR^{25}R^{26}$ can be prepared by treating compounds of Formula Va with the appropriate acylating, sulfinylating, sulfonylating, or phosphonating agent of Formula $\underline{27}$ as set forth in Equation $\underline{26}$.

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In Equation <u>26</u>, the leaving group X in the compound of Formula <u>27</u> may be a halogen, acetate or another molety used by those skilled in the art for acylating, sulfinylating, sulfonylating or phosphonating. Chlorine is the most commonly used leaving group X. In those cases, the compounds of Formula <u>27</u> can be an acid chloride, chloroformate, sulfinyl chloride, sulfonyl chloride, chlorophosphate or carbamoyl chloride.

The compound of Formula Va is dissolved in an inert solvent such as methylene chloride, tetrahydrofuran (THF), or benzene arid treated with the compound of Formula 27 and a base at a temperature ranging from 0°C to 100°C. Triethylamine, N,N-diisopropylethylamine, and other tertlary-amine bases are preferred.

The product of Formula Vc can be isolated by evaporation of the solvent and dissolving the residue in a water immiscible solvent such as ether. This solution may be washed with a dilute aqueous mineral acid, water, and brine, and dried. Evaporation of the solvent followed by crystallization or chromatography affords the purified product.

In cases where R²³ is C(=O)NR²⁶R²⁶ and R²⁵ is H, or C(=S)NHR²⁶. The compounds of Formula Vd can be prepared by treating the compound of Formula Va with an isocyanate or an isothiocyanate as set forth in Equation 27 below.

Equation 27

$$\frac{\text{Ya} + \text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{W} = \text{S OR O}} = \frac{\text{R}^{1} \cdot \text{N}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{R}^{26} \cdot \text{N}} = \frac{\text{R}^{26} - \text{N} - \text{C} - \text{W}}{\text{N}} = \frac{\text{R}^{26} - \text{N} - \text{N}}{\text{N}} = \frac{\text{R}^{26} - \text{N}}{\text{N}} = \frac{\text{R}^$$

The compound of Formula Va is dissolved in an inert solvent such as toluene, THF, acetonitrile, or 1,2-dichloroethane and treated with the isocyanate or isothlocyanate, at a temperature ranging from 0° to 50°C. The product of Formula Vd can be isolated by evaporation of the solvent followed by crystallization or chromatography.

Compounds of Formula VI can be similarly prepared from compounds of Formula II according to the procedures described for the preparation of the compounds of Formula V.

The metal complexes of the compounds I-VI of the invention include complexes with copper, zinc, iron, magnesium or manganese cations. These complexes can be made by combining the compound with the metal salt, either in aprotic solvents such as either or tetrahydrofuran or they can be generated in protic solvents such as methanol. The complex may crystallize and precipitate from solution or the complex is crystallized as the solvent is removed.

Those skilled in the art will recognize that Formulae I, II, V and VI can contain two or more asymmetric carbon atoms. The stereoisomers that result can be separated using standard methods known in the art if desired

Without further elaboration, it is believed that one skilled in the art can, using the preceding description, utilize the present invention to its fullest extent. The following preferred specific embodiments are, therefore, to be construed as merely illustrative, and not limiting of the disclosure in any way whatsoever. In the following examples, all temperatures are set forth in degrees Celsius; unless otherwise indicated, all parts and percentages are by weight.

Compounds of Formula I wherein E is C₁-C₆ alkylthio, C₁-C₆ alkoxy, phenylthio, phenoxy of phenylamino (Iq), as shown below in Equation 28, are prepared by the displacement of the methylthio group in compounds

of Formula 28 by various nucleophiles in the presence of a base. Suitable nucleophiles can be optionally substituted phenois, thiophenois, or anilines, C_1 - C_6 alkylthiols, C_1 - C_6 alcohols and C_1 - C_6 halo-substituted alcohols.

R1 N Nu:
R2 () N Nu:
Dase

R1 N N R2 Nu:
R2 Ig

Nu:= optionally substituted phenol; thiophenol, or anillne; C_1 - C_6 alcohol, C_1 - C_6 alkylthiol, C_1 - C_6 halo-substituted alcohol.

n= 1-3

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Compounds of Formula 28 can be prepared by treating hydrazides of Formula 29 with P_2S_5 in pyridine at reflux followed by alkylating the resulting thio derivative with iodomethane in the presence of a base such as triethylamine as shown in Equation 29.

Compounds of Formula 29 can be prepared by treating compounds of Formula 3a, with compounds of Formula of 30 in the presence of a base such as triethylamine. (Equation 30)

Equation 30

Compounds of Formula 30 can be prepared from the reaction of acid chloride 31. (Equation 31)

Equation 31 $c_{1} = \frac{1}{R^{2}} \frac{1}{R^{2}} c_{1} + NH_{2}NH_{2}-H_{2}O = 30$ n=1,2,3

Compounds of Formula I wherein E is chlorine and bromine (Ir) can be prepared from halogenation of com-

pounds of Formula 29 with halogenating reagents such as phosphorus bromide or phosphorus chloride according to the standard procedures set out in the literature.

EXAMPLE 1

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Synthesis of 2-[3-(2-chlorophenyl)-4,5-dihydro-1H-pyrazol-1-yl]-4,6-dimethylpyrimidine

Paraformaldehyde (7.20 g, 240 mmol), 1-(2-chlorophenyl)ethanone (23.2 g, 150 mmol), dimethylamine hydrochloride (14.7 g, 180 mmol), and hydrochloric acid (12M, 7.2 mL) are combined in 180 mL of ethanol. The suspension which becomes a solution upon heating is heated at reflux for 4 days and then cooled in an ice bath. The solution is evaporated in a rotary evaporator under reduced pressure. As soon as precipitate appears in the flask, the evaporation is stopped. The suspension is cooled in an ice bath and filtered to give 13.6 g of 1-(2-chlorophenyl)-3-(dimethylamino)-1-propanone hydrochloride as a white solid: mp 168-170°C. ¹H NMR (DMSO-d₆) § 2.75 (s, 6H), 3.40 (t, 2H), 3.57 (t, 2H), 7.50 (m, 3H), 7.81 (d, 1H), 11.10 (bs, 1H).

To a suspension of the preceding compound (1.76 g, 7.09 mmol) and 4,6-dimethyl-2-hydrazinylpyrimidine (0.98 g, 7.09 mmol) in 2-propanol (40 mL) is added 50% sodium hydroxide solution (1.2 mL). The suspension is heated at reflux for 7 h and stirred at room temperature overnight. The solvent is removed and the residue is partitioned between 50 mL of water and 60 mL of chloroform. The organic portion is separated and the aqueous portion is extracted with chloroform (60 mL). The two organic portions are combined and dried (MgSO₄). Solvent is removed and the residue is purified by flash chromatography to give 0.35 g of the title compound as a solid: mp 116-118°C. ¹H NMR (CDCl₃) § 2.40 (s, 6H), 3.47 (t, 2H), 4.21 (t, 2H), 6.47 (s, 1H), 7.40 (m, 3H), 7.89 (m, 1H).

EXAMPLE 2

Synthesis of 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine

4-Chloro-1-phenyl-1-butanone (2.00 g, 11.0 mmol), 4,6-dimethyl-2-hydrazinylpyrimidine (1.50 g, 10.9 mmol) and triethylamine (3 mL) are combined in 60 mL of 2-propanol. The solution is heated at reflux overnight. The solvent is removed and the residue is partitioned between 75 mL of 5% sodium bicarbonate solution and 75 mL of ethyl acetate. The organic portion is separated and the aqueous portion is extracted with ethyl acetate (75 mL). The two organic portions are combined, washed with 50 mL brine, dried (MgSO₄) and the solvent is removed. The residue is purified by chromatography to give 0.58 g of 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenyl-pyridazine as a solid: mp 95-97°C. ¹H NMR (CDCl₃) δ 2.11 (m, 2H), 2.42 (s, 6H), 2.71 (t, 2H), 4.10 (t, 2H), 6.50 (s, 1H), 7.30 (m, 3H), 7.90 (m, 2H).

EXAMPLE 3

Synthesis of 4-methyl-2-(4-methyl-3-phenyl-1H-pyrazol-1-yl)pyrimidine

Under nitrogen, 0.35 g (8.86 mmol) of sodium hydride is washed with hexane. To this, 40 mL THF is added and the reaction is cooled to 0°C. A solution of 1.00 g (6.33 mmol) of 4-methyl-3-phenyl-1H-pyrazole (Matsu-kawa, T.; Ohta, B., <u>J. Pharm. Soc. Japn.</u>, 1950, <u>70</u>, 134) in 10 mL THF is added dropwise. After gas evolution ceases, 0.85 g (6.64 mmol) of 2-chloro-4-methylpyrimidine (Moon, M.W. et al.; <u>J. Agric. Food Chem.</u>, 1977, <u>25(5)</u>, 1039-49) in 10 mL THF is added and the reaction is heated at reflux overnight. Water (150 mL) is added

and the mixture is extracted with ethyl acetate (2X50 mL). The organic portions are washed with water, then brine, and dried (MgSO₄) and concentrated to yield 1.6 g of a brown oil.

This oil is purified by chromatography on silica gel to give an oil which solidifies on standing to give 1.02 g of the title compound of this example as a solid. 1 H NMR (CDCl₃) δ 2.3 (s, 3H), 2.6 (s, 3H), 7.0 (d, 1H), 7.3-7.5 (m, 3H), 7.8 (m, 2H), 8.4 (s, 1H), 8.6 (d, 1H).

EXAMPLE 4

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Synthesis of 4,6-dimethyl-2-(5-methyl-4-phenyl-1H-pyrazol-1-yl)-pyrimidine and 4,6-dimethyl-2-(3-methyl-4-phenyl-1H-pyrazol-1-yl)-pyrimidine

To a mixture of 2.0 g (12.3 mmol) of 2-phenyl-3-oxobutanal and 1.7 g (12.3 mmol) of 2-hydrazino-4,6-dimethylpyrimidine (Graf, H. et al., EP293743), and 100 mL methanol, 3 drops of concentrated hydrochloric acid are added. The reaction is heated at reflux for 4 h. The methanol is removed under reduced pressure to leave an oil which crystallizes on standing. This is triturated with hexane to give 2.42 g of pyrazol pyrimidine as a mixture of 68% 4,6-dimethyl-2-(5-methyl-4-phenyl-1H-pyrazol-1-yl)pyrimidine and 32% 4,6-dimethyl-2-(3-methyl-4-phenyl-1H-pyrazol-1-yl)-pyrimidine.

Chromatography of a 1.17 g portion of the pyrazolyl pyrimidines on 120 mL of silica gel eluting with 1:2 ethyl acetate:hexane affords first 0.160 g of 4,6-dimethyl-2-(3-methyl-4-phenyl-1H-pyrazol-1-yl)pyrimidine as a solid with a melting point of 123-124.5°C. ¹H-NMR (CDCl₃) δ 2.56 (s, 9H), 6.92 (s, 1H), 7.3-7.55 (m, 5H), 8.70 (s, 1H).

Also eluting is 0.782 g of a mixture of the two title compounds of this example in a 70:30 ratio, respectively, and finally 0.175 g of 4,6-dimethyl-2-(5-methyl-4-phenyl-1H-pyrazol-1-yl)pyridine as a solid melting at 93.5-94°C. ¹H-NMR (CDCl₃) δ 2.58 (s, 6H), 2.75 (s, 3H), 6.98 (s, 1H), 7.3-7.45 (m, 5H), 7.85 (s, 1H).

EXAMPLE 5

Synthesis of 3-(4-chlorophenyl)-1,4,5,6-tetrahydro-1-[4-methyl-6-trifluoromethyl)-2-pyrimidinyl]pyridazine

4-chloro-1-(4-chlorophenyl)-1-butanone (690 mg, 3.16 mmol), 4-methyl-6-trifluoromethyl-2-hydrazinopyrimidine (500 mg, 2.87 mmol), butanesulfonic acid (5 drops) and 3Å molecular sleves (1 scoop) are combined in 14 mL of anhydrous acetonitrile. The mixture is stirred overnight at room temperature, diluted with dichloromethane and filtered. The filtrate is washed with saturated sodium bicarbonate, dried (Na₂SO₄), filtered and concentrated. The residue is passed through a plug of silica gel using 30% of ethyl acetate/hexane. The filtrate is concentrated, dissolved in 14 mL of anhydrous THF. Sodium hydride (130 mg of 60% dispersion, 3.16 mmol) is added and the mixture is stirred for 10 min at 25°C. Saturated ammonium chloride solution and ether are added. The ether layer is separated, washed with saturated sodium chloride solution dried (Na₂SO₄), filtered, and concentrated. The residue is purified by chromatography to give 580 mg (60%) of the title compound as a solid:mp 150-152°C. ¹H NMR (CDCl₃) δ 2.1(m, 2H), 2.6(s, 3H), 2.7(m, 2H), 4.1(m, 2H), 6.9(s, 1H), 7.4(m, 2H), 7.8(m, 2H).

EXAMPLE 6

Synthesis of 3-(3,4-dimethylphenyl)-1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydropyridazine

To a stirred solution of 4,6-dimethyl-2-hydrazinopyrimidine (500 mg, 3.62 mmol) in 7.2 mL of acetic acid under nitrogen is added 4-chloro-1-(3,4-dimethyl-phenyl)-1-butanone (763 mg, 3.62 mmol). The solution is stirred at 25°C overnight. Acetic acid is removed. The residue is taken up in dilute sodium bicarbonate solution, extracted with dichloromethane twice, dried (MgSO₄) and concentrated to give the intermediate hydrazone as a brown oily solid (1.21 g). A portion of this solid (200 mg, 0.60 mmol) is dissolved in 3 mL of anhydrous THF and stirred under nitrogen. Sodium hydride (29 mg of 60% dispersion, 0.72 mmol) is added in 3 portions. After 25 minutes, 2 drops of water is added. The mixture is diluted with 20 mL of water, extract with dichloromethane (4 x 5 mL), and extracted with 10 mL of ethyl acetate. The organic extracts are combined, dried (MgSO₄) and concentrated. The residue is purified by chromatography to give 115 mg (65% yield over 2 steps) of the title compound as a solid: mp 119-120°C. ¹H NMR (CDCl₃) δ 2.1 (m, 2H), 2.27(s, 3H), 2.30(s, 3H), 2.42(s, 6H), 2.7 (t, 2H), 4.1 (dd, 2H), 6.49(s, 1H), 7.1 (d, 1H), 7.55(dd, 1H), 7.7 (d, 1H).

EXAMPLE 7

Synthesis of 2-((3-(3,4-dimethylphenyl)-5,6-dihydro-1(4H)-pyridazinyl))-4-methylquinazoline

To a solution of 2-hydrazino-4-methylquinazoline (500 mg, 3.34 mmol) in 18 mL of anhydrous acetonitrile under nitrogen is added 4-chloro-1-(3,4-dimethylphenyl)-1-butanone (770 mg, 3.67 mmol), butanesulfonic acid (5 drops), and 3Å molecular sieves (1 scoop). The mixture is stirred at 25°C overnight. An excess amount of potassium carbonate is added and the mixture is stirred over a weekend. Dichloromethane and water are added. The organic layer is separated and washed with saturated sodium chloride solution dried (Na₂SO₄) and concentrated. The residue is purified by chromatography to give 670 mg (62%) of the title compound as a yellow solid: mp 159-161°C. ¹H NMR (CDCl₃) δ 2.18(m, 2H), 2.29(s, 3H), 2.33(s, 3H), 2.75(t, 2H), 2.93(s, 3H), 4.2 (m, 2H), 7.15 (d, 1H), 7.3 (m, 1H), 7.6-7.8(m, 4H), 7.9 (d, 1H)

EXAMPLE 8

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Synthesis of 2-[3-(4-chlorophenyl)-5,6-dihydro-1(4H)-pyridazinyl]-4-methylquinazoline

To a solution of 2-hydrazino-4-methylquinazoline (300 mg, 2.0 mmol) in 15 mL of anhydrous acetonitrile under nitrogen is added 4-chloro-1-(4-chlorophenyl)-1-butanone (0.48 g, 2.2 mmol) and butanesulfonic acid (3 drops). The reaction mixture is stirred at 25°C overnight. The mixture is filtered and the solid washed with hexane to yield 0.35 g (53%) of the title compound: mp 248-252°C. ¹H NMR (CDCl₃) δ 2.22(m, 2H), 2.9 (t, 2H), 2.99(s, 3H), 4.3 (m, 2H), 7.5 (m, 4H), 7.95(d, 2H). 8.45(d, 2H).

EXAMPLE 9

EXMINIFLE

Synthesis of 3-(3,4-dimethylphenyl)-1-(4,6-dimethyl-2-pyrimidinyl)hexahydropyrida-ine

A solution of 1-(4,6-dimethyl-2-pyrimidinyl)-3-(3,4-dimethylphenyl)-1,4,5,6-tetrahydropyridazine (0.30 g, 1.02 mmol) in anhydrous 1,2-dimethoxyethane (5 mL) is added dropwise to a mixture of titanium (IV) chloride (1,5 mmol, 1.5 mL) and sodium borohydride (3.06 mmol, 0.12 g) at 0°C in 10 mL of 1,2-dimethoxyethane. The reaction mixture is allowed to warm to room temperature and is stirred for 16 h. The reaction is then quenched with water, basified with saturated aqueous sodium bicarbonate and extracted three times with dichloromethane. The combined organic extracts are washed with brine, dried over sodium sulfate and concentrated. Flash chromatography on silica gel affords 210 mg of the desired product as an oil. ¹H NMR (CDCl₃) δ 7.25 (s, 1H), 7.17 (m, 2H), 6.4 (bs, 1H), 6.22 (s, 1H), 4.8 (m, 1H), 3.7 (m, 1H), 3.2 (m, 1H), 2.28 (s, 3H), 2.27 (s, 9H), 1.9 (m, 2H), 1.8 (m, 1H), 1.7 (m, 1H).

EXAMPLE 10

Synthesis of 3-(4-chlorophenyl)-1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydropyridazine, complex with zinc chloride

A solution of 302 mg (1.00 mmol) of 3-(4-chlorophenyl)-1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydropyridazine in 5 mL of ether and 5 mL of tetrahydrofuran is treated with 1.0 mL of 1.0M ZnCl₂ in ether at room temperature. As the addition proceeds, a white crystalline precipitate begins to form. The reaction mixture is stirred at room temperature for 18 h and then concentrated *in vacuo* to yield 0.46 g of a white crystalline solid, mp 231-232°C. This material is crystallized from dichloromethane to yield white needles. ¹H NMR (CDCl₃, 400 MHz): 7.78 (d, 8.5 Hz, 2H); 7.52 (d, 8.5 Hz, 2H); 6.71 (s, 1H); 4.31-4.25 (m, 2H); 2.92 (t, 6.4 Hz, 2H); 2.66 (s, 3H); 2.48 (s, 3H); 2.26-2.16 (m, 2H).

EXAMPLE 11

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Synthesis of 3-(4-chlorophenyl)-1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydropyridazine, complex with copper (II) chloride

A solution of 401 mg (1.33 mmol) of 3-(4-chlorophenyl)-1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-pyridazine in 8 ml of tetrahydrofuran is treated with 179 mg of anhydrous CuCl₂ dissolved in 4 ml of absolute methanol. The reaction mixture immediately acquires a dark olive-green color and is stirred at room temperature

for 18 h. After concentration *in vacuo*, the resulting residue is triturated with ether several times, concentrating *in vacuo* each time. A total of 0.55 g of a free-flowing emerald green solid is thus obtained, mp 135-138°C. Crystallization from dichloromethane results in emerald green prisms.

Examples of compounds of the invention are shown in Tables 1-35. One skilled in the art will recognize that these compounds can readily be converted to their conjugate acid salts. The compounds of Tables 1-35 exemplify the limits of the broadest method claim. Some of the compounds listed are outside the scope of the compound claims. Abbreviations employed in Tables 1-35 are as follows:

10	t - is tertiary	MeO - is methoxy
	s - is secondary	1-PrO - is isopropoxy
	n - is normal	EtS - is ethylthio
	i - is <u>iso</u>	sec-BuS - is secondary-butylthio
15	<u>c</u> - is <u>cyclo</u>	CN - is cyano
	Me - is methyl	TMS - is trimethylsilyl
	Et - is ethyl	Ac - is acetyl
20	Pr - is propyl	MeS(O) - is methylsulfinyl
	Bu - is butyl	MeS(O)2 - is methylsulfonyl
	Hex - is hexyl	
25	Ph - is phenyl	
20	Bzl - is benzyl	
	i-Pr - is isopropyl	
	t-Bu - is tertiary-butyl	
30	n-Bu - is normal-butyl	
	C-br - is chclobrobhl	
	g-Hex - is cyclohexyl	
35	sec-Bu - is secondary-butyl	

TABLE 1

Ü			n N	, n		
10			R1	N R5	3 ,	
15			,	6 5	3 R ⁶ 4 R ⁷	
20			R ⁷ is H; R	3 is Me;		
	\mathbb{R}^1	B ⁵	\mathbb{R}^6	R1	R ⁵	R ⁶
	н	н	н	н	H	4-F
	Н	F	н	н	F	4-F
25	н	Cl	н	н	CI	4-F
	н	Me	н	н	Me	4-F
	н	CF3CH2O	н	н	с ғ₃сн₂о	4-F
30	Н	CF3	н	н	CF ₃	4-F
	н	MeO	н	н	MeO	4-F
	н	н .	4-C1	Me	н	H
35	Me	F	5-F	Me	F.	H
33	Me	CI	5-Cl	Me	Cl	H
	Me	Me	4-F	Me	Me	Н
	Me	CF3CH2O	4-F	Me	CF3CH2O	H
40	Me	CF ₃	4-F	Me	CF ₃	Н
	Me	MeO	4-F	Ме	MeO	Н
	н	н	3-CF3	Et	H	Н
45	н	F	6-F	Et	F	Н
				1		

6-Cl

6-Me

Cl

Me

50

н

H

55

H

. н

C1

Me

Et

Et

			R ⁷ is H; R ³	is Me; R		
	R ¹	R ⁵	R ⁶	R1	R ⁵	B ⁶
5	н	CF3CH2O	6-Me	Et	Cr ₃ CH ₂ O	н
	H	CF ₃	6-Ma	Et	CF3	н
	н	MeO	6-MeO	Et	MeO	н
	н	н	4-Br	1-Pr	H	H
10	Ме	F	6-F	i-Pr	F	н
	Ме	Cl	6-C1	<u>i-Pr</u>	Cl	н
	Me	Me	6-Me	1-Pr	Me	H
15	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CF3CH2O	н
	<u>t</u> -Bu	CF3	н	<u>i-Pr</u>	CF ₃	н
	sec-Bu	MeO	н .	<u>i</u> -Pr	MeO	н
	н	HCF20	н	н	HCF ₂ O	6-HCF ₂ O
20	H	Br	н	н	I	н
	н	L-BuO	н	н	EtO	н
	Н	н	4-NMe ₂	Me	н	4-NEt ₂
25	н	H	4-piperidino	Me	H	4-pyrolidino
			R ⁷ із н; R ³	is Me; I	14 is H	
30	R ¹	R ⁵	R ⁶	B1	R ⁵	₿ ⁶
	н	н	н	н	H	4-F
	н	F	H	н	F	4-F
	H	Cl	н	н	Cl	4-F
35	н	Me	H :	н	Me	4-F
	н	CF3CH2O	H	H	CF3CH2O	4-F
	H	CF3	н	н	CF ₃	4-F
40	Н	MeO	н	н	MeO	4-F
	н	н	4-Cl	Me	Н	н
	Me	F	5-F	Me	F	H
15	Me	Cl	5-C1	Me	Cl	н
45	Me	Ме	4-F	Me	Me	н

50

			R ⁷ is H; R ³	is Me; R ⁴	is H	
	R1	R 5	R ⁶	R1	R ⁵	R6
5	Me	ст ₃ сн ₂ о	4-F	Me	CF3CH2O	H
	Me	CF3	4-F	Me	CF3	H
	Me	MeO	4-F	Me	MeO	н
10	н	н	3-CF3	Et	H	н
	н	r	6- F	Et	F	H
	H	Cl	6-C1	Et	Cl	H
	н	Ме	6-Me	Et	Mo	H
15	н	CF3CH2O	6-Me	Et	CF3CH2O	H
	н	CF3	6-Me	Et	CF3	H
	н	MeO	6-MeO	Et	MeO	H
20	н	H	4-Br	1-Pr	H	H
	Me	F	6-F	1-Pr	F	Н
	Me	Cl	6-C1	i-Pr	CI	Н
	Me	Me	6-Me	1-Pr	Me	H
25	n-Pr	CF3CH2O	н	<u>i-Pr</u>	CF3CH2O	н
	<u>t</u> -Bu	CF3	н	<u>i-</u> Pr	CF3	н
	sec-Bu	MeO	н	i-Pr	MeO	H
30	H	NO ₂	6-C1	Me	CN	6-CN
	н	Br	6-Br	Me	MeS (0) 2	4-F
	н	HCF ₂ O	4-Me0	Me	<u>i</u> -Pr	H
35			R ⁷ is H; R ³	is H; R ⁴	is H	
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R ⁶
	н	н	н	н	H	4-F
40	н	F	н	H	r	4-F
	н	C1	н	Н	cı	4-F
	н	Me	н	н	Me	4-F
45	H	CF3CH2O	н	н	CF ₃ CH ₂ O	4-F
	н	CF ₃	н	н	CF3	4-F
		-				

			R ⁷ is H; R ³	is H; R4	is H	
	B ¹	R ⁵	R ⁶	R1	R ⁵	R ⁶
	н	MeO	н	н	MeO	4-F
5	н	н	4-C1 ·	Мө	H	H
	Мо	P	5- F	Me	r	H
	Мо	CI	5-C1	Me	Cl	H
10	Me	Me	4-F	Me	Me	H
	Мө	сг ₃ сн ₂ о	4-F	Me	CF3CH2O	H
	Me	cr ₃	4-F	Me	CF3	H
15	Me	MeO	4-F	Me	MeO	H
	н	н	3-CF ₃	Et	Н	H
	н	F	6-F	Et	F	н
	н	Cl	6-C1	Et	Cl	H
20	H	Me	6-Me	Et	Ме	H
	н	сғ ₃ сн ₂ о	6-Me	Et	CF3CH2O	H
	н	CF ₃	6-Me	Et	CF3	H
25	Н	MeO	6-MeO	Et	MeO	Н
	Н	н .	4-Br	<u>i</u> -Pr	H	н
	Me	F	6-F	<u>1</u> -Pr	F	H
30	Me	Cl	6-C1	1-Pr	Cl	н
00	Ме	Me	6-Me	1-Pr	Me	H
	n-Pr	CF3CH2O	н	<u>1</u> -Pr	CF3CH2O	н
	t-Bu	CF3	н	<u>i</u> -Pr	CF ₃	Н
35	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	Н
	Me	<u>t</u> -Bu	н	н	TMS	6-Me
	Me	<u>i</u> -PrO	н	H	TMS	4-F
40	Me	CF3CF2CF2	н	н	TMS	5-CF3
	R ¹	is H; R ³ and	R ⁴ are Me	R ¹	, R^3 and R^4	
	R ⁵	B ⁶	R ⁷	R ⁵	R ⁶	B7
45	н	4-C1	5-C1	Cl	4-C1	6-C1
	Н	4-F	6- <u>sec</u> -Bu	Cl	4-C1	6-MeO
	н	4-Et	5-I	C1	3-Me	4~C1

	R ¹ is H; F	R ³ and R ⁴	are Me	R ¹ , R	3 and R4	are Me
	R ⁵	R6	R ⁷	<u>R</u> 5	R ⁶	R7
5	н	3-F 6-	-CF3CH2O	Cl	3-CF3	5-CF3
	н .	4-Ma 6-	-Cr ₃ Cr ₂	cı	4-MeO	5- ± -BuO
	н	4-Br	6-n-BuO	Cl	3-n-Bu	4-Me
10	Me	4-Me	6-Me	TMS	н	H
	Me	4-F	6-Me	TMS	н	4-F
	Me	4- <u>t</u> -Bu	6- <u>t</u> -Bu	TMS	H	6-Ma
15	Me	4-CF3	6-C1	TMS	H	6-MeO
,5	Me	3-Me	5-Br	TMS	H	6-C1
	Me	5- <u>1</u> -Pr	6-MeO	TMS	н	6-HCF20
	t-Bu	6- <u>t</u> -Bu	н	Br	6-Br	H
20	<u>t</u> -Bu	4- <u>t</u> -BuO	н	NMe ₂	Н	н
	<u>t</u> -Bu	H	н	CONHET	Н	Н
	CF ₃ (CH ₂) 30	н	н	CN	Н	H
25	$CF_3(CF_2)_2$	н	н	4-F-Ph	н	H
	(CF ₃) ₂ CH	H -	н	2-MePh	Н	н
	sec-BuS	H	Н	NO ₂	6-Me	Н
	MeS	6-MeS	н	4-Me-PhO	Н	H
30	EtS	4-F	н	PhS	H	Н
	MeS (O)	H	н	CO2H	3-MeO	H
	<u>i</u> -Prs(0)	н	Н	CO ₂ H	н	H
35	<u>t</u> -BuS (O) 2	H	н	HCmC	Н	H
	MeS (0) 2	H	н	MeC≕C	H	H
	CH ₂ -CH	Н	н	MeC=CCH ₂ O	4-F	Н
40	$\mathrm{CH_2}$ =C ($\mathrm{CH_3}$) $\mathrm{CH_2}$	н	н	<u>t</u> -BuO	Н	H
	CH2-CHCH20	H	н	n-PrO	Н	Н
	MeOCH ₂ CH ₂	H	н	EtO	5-EtO	Н
	MeO ₂ C	H	н	Ac	н	H
45	MeOCH ₂ O	H	н	sec-BuCO	Н	H

	R4	is Me; R ⁶ and 1	R ⁷ are H		R^6 and R^7	
	R ¹	R ³	R ⁵	R ³	R ⁴	R ⁵
5	н	g-Pr	н	c-Pr	<u>c</u> -Pr	H
	н	C-PI	r	c-Pr	c-Pr	F
	н	g-Pr	C1	<u>c</u> -Pr	c-Pr	Cl
	н	g-Pr	Ме	c-Pr	g-Pr	Me
10	н	c-Pr	CF3CH2O	C-br	CH ₃ C≡C	CF3CH2O
	н	g-Pr	CF3	g-Pr	сн3с=с	CF ₃
	н	G-Pr	MeO	c-Pr	CH3C=C	MeO
15	Ме	MeC=C	н	g-Pr	CF ₃	н .
	Ме	MeC=C	r	<u>c-Pr</u>	CF ₃	F
	Me	MeC=C	Cl	<u>c</u> -Pr	CF3	Cl.
20	Me	MeC=C	Me	<u>c-Pr</u>	сн ₃ осн ₂	Me
10	Me	MeC=C	CF3CH2O	c-Pr	CF3CH2O	CF3CH2O
	Me	Cl	CF3	<u>c-Pr</u>	MeS	CF ₃
	ме	CF ₂ Cl	MeO	g-Pr	CH2-C(Et)	MeO
25	i-Pr	CF ₃	Н	c-Pr	CH ₂ -CHCH ₂	H
	<u>i</u> -Pr	sec-Bu	F	<u>c</u> -Pr	<u>t</u> -BuO	F
	<u>i</u> -Pr	CF ₃	Cl	g-Pr	HCF ₂ O	Cl
30	i-Pr	CF ₃	Ме	<u>c</u> -Pr	CH2=CHCH2O	
	<u>i-Pr</u>	CF ₃	CF3CH2O	g-Pr	MeC≡CCH ₂ O	CF ₃ CH ₂ O
	<u>i</u> -Pr	Et	CF ₃	<u>c</u> -Pr	NMe ₂	CF3
05	<u>i</u> -Pr	MeO	MeO	c-Pr	NHEt	MeO
35	Et	<u>c</u> -Pr	н	CI	C1	Н
	Et	MeC = C	F	Cl	Cl	F
	Et	CH ₂ F	CI	CI	Cl	Cl
40	Et	CF3CH2O	Me	CI	Cl	Me
	Et	<u>i</u> -Pr	CF3CH2O	сн3с=с	Cl	CF3CH2O
	Et	n-Bu	CF3	сн ₃ с=с	F	CF ₃
45	Et	HC≡CCH ₂ O	MeO	сн3с≖с	СH ₃ 0СH ₂	MeO
	<u>t</u> -Bu	Br	Cl	ocf ₃	sec-Bu	Cl
	Ph	Cr ₃ (Cr ₂) 3	Me	OCF ₃	Br	Me
	Bzl	sec-BuS	CF ₃ CH ₂ O	OCF ₃	1-br	CF ₃ CH ₂ O
50	Me	NH ₂ ·	н	NH ₂	nH ₂	H
	Me	NMe ₂	н	NMe ₂	NMe ₂	H
	Me	4-NEt2	Н	Me	NH ₂	н
55	Me	4-piperidino	н	Me	NEt ₂	Н

TABLE 2

R ³ 5 R ⁴
4 Ji
5 N N
R ² 4 E

 R^1 and R^2 are H; R^3 is 4-Me; R^1 , R^2 , and R^3 are H; 20 R^4 is Me R4 is Me E E 1-naphthalenyl 1-naphthalenyl 2-furanyl 25 2-furanyl 2-naphthalenyl 2-naphthalenyl 3-thienyl 3-thienyl 2,5-dimethyl-3-furanyl 2,5-dimethyl-3-furanyl 30 2,5-dimethyl-3-thienyl 2,5-dimethyl-3-thienyl 4-methylphenoxy 4-methylphenoxy 2-chlorophenoxy 2-chlorophenoxy 35 2,6-dimethylphenoxy 2,6-dimethylphenoxy 4-cyanophenylthio 3-methylphenylthio 4-methylphenylamino phenylamino Cl benzyl 40 n-hex Et Me sec-Bu c-hexyl c-propyl CF3CH2CH2 cis-2-methylcycloheptyl n-butoxy sec-butylthio C1 (CH₂) 50 CF3CH2O 50 4-methyl-3-furanyl 5-methyl-2-thienyl

55

5-methyl-2-pyridyl

10

15

2-methyl-3-pyridyl

```
R1 and R2 are H; R3 is 4-Me;
      R^1, R^2 and R^3 are H; R^4 is Me
                                                R4 15 Mo
5
                                                4-chloro-3-pyridyl
      4-pyridyl
                                                2-indanyl
      2-indanyl
10
                                                2-tetrahydronaphthalenyl
      2-tetrahydronaphthalenyl .
                                                R^{1} and R^{4} are Me; R^{3} is 4-Me;
      R^1, R^2, R^3 and R^4 are H
                                                R^2 is H
15
                                                E
                                                1-naphthalenyl
      1-naphthalenyl
                                                2-furanyl
      2-furanyl
20
                                                3-thienyl
      3-thienyl
                                                3-pyridyl
      3-pyridyl
                                                            R^3 is H; R^4 is Me
              R^3 is 4-Me; R^4 is Me
25
                                                \mathbb{R}^{1}
                                                       R<sup>2</sup>
                                                                      E
              R<sup>2</sup>
      R1
                           E
                                                                      Ph
                                                H
                                                        5-Et
              5-Me
                           Ph
                                                H
                                                       5-<u>sec</u>-Bu
                                                                      2-Me-Ph
              5-1-Pr
                           2-Me-Ph
                                                                      2-C1-Ph
                                                       5-CF3 (CF2)3
                           2-C1-Ph
                                                н
              5-n-Bu
                                                       5-<u>t</u>-Bu
                                                                      2-MeO-Ph
                           2-MeO-Ph
                                                H
              5-CN
                                                                      2-CF3CH2O-Ph
                                                H
                                                       5-FCH<sub>2</sub>
                           2-CF3CH2O-Ph
              5-CF3
35
                                                       5-n-Pr
                                                                      1-naphthalenyl
                           1-naphthalenyl
                                                н
              5-CF3CH2
                                                       4-Me
                                                                      Ph
              5-Me
                                                Me
      i-Pr
                                                                      2-Me-Ph
                                                       4-Me
                                                Mo
                           2-Me-Ph
      i-Pr
              5-Me
```

40

45

50

~					
ກລ	4 -	4-Me:	D 4	4 -	Ma.
π-	LD		Α.		226

R ¹	R ²	E
i-Pr	5-Me	2-C1-Ph
<u>i</u> -Pr	5 -Me	2-MeO-Ph
i-Pr	5-Me	2-cf3CH20-Ph
cı .	н	·Ph
r	H	2 -Me- Ph
CF3CF2	н .	2-C1-Ph
CH2=CHCH2	H	2-MeO-Ph
CO ₂ Me	н	2-cf3CH2O-Ph
2-Me-Ph	н	Me
Bzl ·	н	Ph
2-naphthalenyl	Н	<u>n</u> -Bu
3-thienyl	Н	CF3CF2
3-pyridyl	н	Me
CN	5-Me	Ph
<u>t</u> -Bu	5-Me	2-Me-Ph
C1CH ₂	5-Me	2-C1-Ph
Et	5-Me	2-MeO-Ph
n-Pr	5-Me	2-CF3CH2O-Ph
ме	4-Me	2-CF3-Ph
i-Pr	4-Me	2-CF ₃ -Ph
CF ₃	4-CF3	2-CF ₃ -Ph
Me	4-Me	2-TMS-Ph
Н	5-OH	Ph
н	5-MeO	4-Me-Ph
н	5-0C (O) Me	4-C1-Ph
Н	5-0C (0) NHMe	Ph

R³ is H; R⁴ is Me

		-,	
	R ¹	R ²	E
5	Me	4-Me	2-C1-Ph
5	Me	4-Me	2-MeO-Ph
	Me	4-Mo	2-CF3CH2O-Ph
	Br .	н	Ph
10	CN	H	2-Me-Ph
	Ac	Н	2-C1-Ph
	CH3CmCCH2	н	2-MeO-Ph
15	CO2Et	н	2-CF3CH2O-Ph
	4-Cl-Ph	н	Ph
	5-Me-3-furyl	н	<u>i</u> -Pr
	EtCO	н	2-Cl-Ph
20	2-furyl	4-Me	CF ₃
	Ph	5-Me	Me
	CN	4-Me	Ph
25	<u>t</u> -Bu	4-Me	2-Me-Ph
	FCH ₂	4-Me	2-C1-Ph
	Et	4-Me	2-MeO-Ph
30	C1 (CH ₂) ₄	4-Me	2-CF ₃ CH ₂ O-Ph
	Me	4-Me	2-CF3-Ph
	i-Pr	5-CN	2-CF ₃ -Ph
	CF3	5-Me	2-CF3-Ph
35	i-Pr	4-Me	2-TMS-Ph
	Н	5-OH	Ph
	н	5-MeO	4-Me-Ph
40	н	5-00 (0) Me	4-Cl-Ph
	н	5-00 (0) NHEt	Ph

TABLE 3

5	R3 5 R4
	Y N
10	N
	\frac{N}{\pi_{\text{R}}^{5}}
15	R ¹ 13 R ⁶
	6 5 _R 7

2	20		_	7	. n4	. V 40 CU	
			R	7 is H; R ³ is H			
		R1	R ⁵	R ⁶	R1	B ⁵	R6
	25	H	н	н	Ħ	н	4-F
^	.0	н	F	н	н	F	4-F
		н	Cl	н	Н	Cl	4-F
		н	Me	н	H	Me	4-F
3	30	н	CF3CH2O	н	Н	CF3CH2O	4-F
		н	CF ₃	н	Н	CF ₃	4-F
		н	MeO	н	н	MeO	4-F
;	35	н	н	4-C1	Me	н	H
35		Me	F	5-F	Me	F	H
		Ме	Cl	5-C1	Me	Cl	H
40		Me	Me	4-F	Me	Me	H
	40	Me	CF3CH2O	4-F	Me	CF3CH2O	н
		Me	CF ₃	4-F	Me	CF ₃	H
45		Me	MeO	4-F	Me	MeO	H
	45	н	н	3-CF3	Et	H	н
		н	F	6-F	Et	F	H
		н	CI	6-C1	Et	Cl	H

50

		R	7 is H; R ³ is H;	R4 is H;		
	R ¹	B ⁵	R ⁶	R1	R ⁵	R ⁶
5	н	Me	6-Me	Et	Me	н
	н	CF3CH2O	6-Ме	Et	CF3CH2O	H
	н	CIF ₃	6-Me	Et	CF3	H
10	н	MeO	6-MeO	Et	MeO	H
	н	Ħ	4-Br .	1-Pr	H	H
	Me	F	6-F	<u>i</u> -Pr	r	н
	Me	Cl	6-C1	<u>i</u> -Pr	Cl	H
15	Me	Ме	6-Me	1-Pr	Me	H
	n-Pr	ст ₃ сн ₂ о	н .	<u>i</u> -Pr	CF3CH2O	Н
	<u>t</u> -Bu	CF3	н	<u>i</u> -Pr	CF ₃	Н
20	sec-Bu	MeO	н	1-Pr	Me0	н
	н	HCF20	н	H	HCF ₂ O	6-HCF ₂ O
	Н	Br	н	н	I	H
25	н	t-BuO	н	Н	EtO	H
R ⁷ is H; R ³ is H; R ⁴ is Me; Y is CH						
•	B1	<u>r</u> 5	R ⁶	R ¹	R ⁵	R ⁶
30	н	н	н	H	Н	4-F
	H	F	н	н	F	4-F
	н	Cl	н	Н	Cl	4-F
35	н	Me	н	н ,	Me	4-F
	H	CF3CH2O	н	H	CF3CH2O	4-F
	н	CF ₃	н	H	CF ₃	4-F
40	H	MeO	н	H	MeO	4-F
	н	H	4-C1	Me	Н	н
	Me	F	5-F	Me	F	Н
	Me	Cl	5-C1	Me	Cl	H
45	Me	Me	4~F	Me	Me	н
	Me	CF3CH2O	4-F	Me	CF3CH2O	H
	Me	CF ₃	4-F	Me	CF3	н

R^7 is H; R^3 is H; R^4 is Me; Y is CH						
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R6
5	Me	MeO	4-r	Mo	MeO	R
	H	H	3-CF3	Et	H	H
	R	F	6- r	Et	F	H
10	H	CJ	6-C1	Et	CI	H
70	н	Mo	6-Me	Et	Me	H
	н	CF3CH2O	6-Me	Et	Cr3CH2O	H
	H	CF ₃	6-Me	Et	CF ₃	H
15	н	MeO	6-MeO	Et	MeO	H
	н	н	4-Br	1-Pr	н	H
	Me	F .	6-F	<u>1</u> -Pr	F	H
20	Me	Cl	6-C1 ·	1-Pr	Cl	H
	Me	Me	6-Me	<u>1</u> -Pr	Me	H
	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CF ₃ CH ₂ O	H
	<u>t</u> -Bu	CF3	н	i-Pr	CF3	H
25	sec-Bu	MeO	н	i-Pr	MeO	H
	н	HCF20	н	н	HCF ₂ O	6-HCF20
	н	Br	н	Н	I	H
30	н	<u>t</u> -BuO	н	H	EtO	H
		R ⁷	is H; R ³ is 4-M			
35	R1	R ⁵	R ⁶	R1	R ⁵	R ⁶
	н	н	н	H	H	4-F
	н	F	н	н	F	4-F
	н	Cl	н	H	Cl	4-F
40	H	Me	н	Н	Me	4-F
	н	CF3CH2O	н	H	cr₃ch₂o	4-F
	H	CF3	н	Н	CF3	4-F
45	H	MeO	н	Н	MeO	4-F
	н	н	4-C1	Me	H	H
	Me	r	5-F	Me	r	H
50	Me	Cl	5-C1	Me	Cl	н .
50	Ме	Me	4-F	Me	Me	H
	• .	•				

```
R^7 is H; R^3 is 4-Me; R^4 is Me; Y is N
                                                            B<sup>5</sup>
                                                  B1
                                R^6
         B^1
                    R5
                                                            CF3CH2O
                                                                        H
                    CF3CH2O
                                4-F
                                                  Me
         Me
5
                                                  Me
                                                            CF3
                                4-F
                    CF3
         Me
                                                            MeO
                                                  Mo
                    MeO
                                4-F
         Me
                                                  Et
                                3-CF3
                    H
         H
10
                                                   Et
                                                            ľ
         H
                                                            Cl
                                                                        H
                                6-Cl
                                                   Et
         H
                    Cl
                                                   Et
                                                            Me
                                6-Me
                    Me
         H
                                                            CT3CH2O
                                                   Et
                                6-Me
                    CF3CH2O
15
         Ħ
                                                                        H
                                                            CF3
                                                   Et
                                6-Me
                    CF3
         H
                                                            MeO
                                                                        H
                                                   Et
                    MeO
                                6-MeO
         H
                                                                        H
                                                   1-Pr
                                4-Br .
         H
20
                                                   1-Pr
                                6-F
                     F
         Me
                                                   1-Pr
                                                            Cl
                                                                        н
                                6-C1
                     СI
         Me
                                                   i-Pr
                                                            Me
                                6-ме
                    Me
         Me
25
                                                   1-Pr
                                                            CF3CH2O
                     CF3CH2O
         n-Pr
                                                   i-Pr
                                                            CF3
                     CF3
         <u>t</u>-Bu
                                                            MeO
                                                   <u>i-Pr</u>
                    MeO
                                н
         sec-Bu
                                                                        6-HCF2O
                                                             HCF20
                                                   H
                     HCF20
                                н
         н
30
                                                             Br
                                                                        Н
                                                   Н
                                н
         H
                     Br
                                                                        н
                                                             t-BuO
                                н
                     t-BuO
         H
                                                     R^{1}, R^{6}, and R^{7} are H; Y is N
35
             R4 is Me; R6 and R7 are H
                        Y is CH
                                                                        \mathbb{R}^5
                                                   B3
                                                            B4
                    R3
                                \mathbb{R}^5
         R1
                                                   4-g-Pr g-Pr
                                H
40
                     4-g-Pr
         H
                                                   4-g-Pr g-Pr
                                F
                     4-g-Pr
         H
                                                   4-g-Pr g-Pr
                                                                        Cl
                                Cl
                     4-g-Pr
         н
                                                   4-g-Pr g-Pr
                                                                        Me
                     4-g-Pr
                                Me
 45
                                                            CH3C=C
                                                                        CF3CH2O
                     4-<u>c</u>-Pr
                                CF3CH2O
         н
                                                   4-g-Pr
                                                            CH<sub>3</sub>C≕C
                                                                        CF3
                     4-<u>c</u>-Pr
                                CF3
         H
                                                   4-g-Pr CH3C=C
                                                                        MeO -
                                MeO
                     4-g-Pr
         Н
```

	R ⁴ i	s Me; R ⁶ and	R ⁷ are H	R1, R6,	and R ⁷ are	H; Y is N
5		Y is CH				
	R^{1}	R ³	R ⁵	R ³	R ⁴	B ⁵
	Me	4-MeC=C	н	4- <u>c</u> -Pr	CF3	H .
	Me	4-MeCmC	F	4- <u>c</u> -Pr	CF ₃	r
10	Me	4-MeC=C	cı .	4- <u>c</u> -Pr	CF ₃	CI
	Me	4-MeC=C	Me	4- <u>c</u> -Pr	сн ₃ осн ₂	Me
	Мө	4-MeC=C	сг3сн20	4-g-Pr	CF3CH2O	CF3CH2O
15	Me	5-C1	CF ₃	4- <u>c</u> -Pr	MeS	CF ₃
	Me	4-CF2Cl	MeO	4- <u>c</u> -Pr	CH2=C(Et)	MeO
	<u>i-Pr</u>	5-CF3 ·	н	4- <u>c</u> -Pr	сн ₂ -снсн ₂	н
	i-Pr	4- <u>sec</u> -Bu	F	4- <u>c</u> -Pr	<u>t</u> -BuO	F
20	i-Pr	4-CF3	CI	4- <u>c</u> -Pr	HCF ₂ O	Cl
	i-Pr	4-CF3	Ме	4- <u>c</u> -Pr	сн ₂ -снсн ₂ о	Me
	<u>i</u> -Pr	4-CF3	CF3CH2O	4- <u>c</u> -Pr	MeC≖CCH ₂ O	CF3CH2O
25	<u>i-Pr</u>	5-Et	CF ₃	4- <u>c</u> -Pr	NMe ₂	CF ₃
	i-Pr	4-MeO	MeO	4- <u>c</u> -Pr	NHEt	MeO
	Et	4- <u>c</u> -Pr	н	4-Cl	Cl	н
30	Et	3-MeC⊯C	F	4-C1	Cl	F
	Et	4-CH ₂ F	cı	4-C1	Cl	Cl
	Et	4-CF3CH2O	Me	4-C1	Cl	Me
	Et	4- <u>i</u> -Pr	CF3CH2O	4-CH3CmC	Cl	CF3CH2O
35	Et	4-n-Bu	CF ₃	4-CH3C=C	F	cr ₃
	Et	4-HC#CCH ₂ O	MeO	4-CH ₃ C≖C	СH30СН2	MeO
	<u>t</u> -Bu	3-Br	Cl	4-0CF3	sec-Bu	Cl
40	Ph	4-CF3 (CF2)3	Me	4-0CF3	Br	Me
	Bz1	4-sec-BuS	CF3CH2O	4-0CF3	1-Pr	CF3CH2O

TABLE 4

R3 4 1 1 N 3 Y N R2 N

 R^1 , R^2 , and R^3 are H; R^4 is Me; Y is CH

1-naphthalenyl 2-furanyl

5

10

15

2-naphthalenyl 3-thienyl

2,5-dimethyl-3-furanyl
2,5-dimethyl-3-thienyl

30
4-methylphenoxy
2-chlorophenoxy

2,6-dimethylphenoxy

35 3-methylphenylthio phenylamino

benzyl

Et

sec-Bu c-propyl

cis-2-methylcycloheptyl

45 <u>sec</u>-butylthio

CF3CH2O

5-methyl-2-thienyl

50 5-methyl-2-pyridyl

 R^1 and R^2 are H; R^3 is 4-Me;

R4 is Me; Y is N

E

1-naphthalenyl

2-furanyl

2-naphthalenyl

3-thienyl

2,5-dimethyl-3-furanyl

2,5-dimethyl-3-thienyl

4-methylphenoxy

2-chlorophenoxy

2,6-dimethylphenoxy

4-cyanophenylthio

4-methylphenylamino

Cl

n-hex

Me

c-hexyl

CF3CH2CH2

n-BuO

C1 (CH2) 50

4-methyl-3-furanyl

2-methyl-3-pyridyl

```
R^1, R^2, R^3 and R^4 are H;
                                                    R^1 and R^4 are Me; R^3 is 4-Me;
                                                   \mathbb{R}^2 is H; Y is N
          Y is CH
                                                    4-chloro-3-pyridyl
          4-pyridyl
                                                    2-indanyl
          2-indanyl
                                                   2-tetrahydronaphthalenyl
          2-tetrahydronaphthalenyl
                                                   \mathbb{R}^1 and \mathbb{R}^4 are Me; \mathbb{R}^3 is 4-Me;
         R^1, R^2, R^3 and R^4 are H;
                                                   R<sup>2</sup> is H; Y is N
         Y is CH
15
                                                    1-naphthalenyl
          1-naphthalenyl .
                                                    2-furanyl
          2-furanyl
20
                                                    3-thienyl
          3-thienyl
                                                    3-pyridyl
          3-pyridyl
25
```

30

35

40

45

50

TABLE 5

R ³ R ⁴
N N
$R^{2} \xrightarrow{5} 4 \xrightarrow{2} R^{5}$
R^1 6 R^7

			-			
20		R^2 is H;	R^3 is Me; R^4	is Me;	R ⁷ is H; R ³	
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R6
	н	н	н	Me	4-Et	н
25	н	4-NMe ₂	н	Me	4- <u>i</u> -Pr	н
	н	4-Me	н	Ме	4-C1	H
1	н	4-Et	н	ме	4-MeO	н
	н	4-n-Pr	н	Me	4-EtO	н
30	н	4-1-Pr	н	Me	4-CF3	н
	н	4- <u>n</u> -Bu	н	Et	Н	H
35	н	4- <u>sec</u> -Bu	н	н	3-NMe ₂	н
	н	4- <u>i-</u> Bu	н	н	3-Me	H
	H	4- <u>t</u> -Bu	н	н	3-Et	н
	н	4-C1	н	н	3-n-Pr	H
40	н	4-Br	н	н	3-1-Pr	н
***	н	4-F	н	н	3- <u>n</u> -Bu	н
	н	4-OH	н	н	3-C1	н
	H	4-MeO	н	H	3-Br	H
45	н	4-EtO	н	н	3-F	н
	н	4-CF3	Н	н	3-OH	н
	н	4-CF3CH2O	н	н	3-MeO	н.
50	Me	н	H	н	3-EtO	H
	Xia	- 4-Me	Н	H	3-CF3	н

		R ² is H;	R ³ is Me; R ⁴	is Me; R	7 is H; R ¹⁸	is H
	R ¹	R ⁵	R ⁶	R1	R ⁵	R ⁶
5	н	3-CF3CH2O	н	н	2-Me	5-Me
	Me	3-Ma	н	н	3-Me	4-Me
	Me	3-Et	н	H	2-Et	4-Et
	Me	3- <u>1</u> -Pr	н	н	2-Et	5-Et
10	Me	3-C1	н .	н	3-Et	4-Et
	Me	3-MeO	н	н	2-Me	5- <u>t</u> -Bu
	Me	3-EtO	н	н	2-C1	4-C1
15	Me	3-CF3	н	н	'2-C1	5-C1
	Et	3-Me	н .	Et	3-MeO	H
	Et	3-Et	н	Et	3-EtO	H
20	Et	3-1-Pr	н .	Et	cr ₃	H
	Et	3-C1	н	Me	2-Me	4-Me
	Et	4-Me	н	Me	2-Me	5-Me
	Et	4-Et	н	Me	3-Me	4-Me
25	Et	4- <u>1</u> -Pr	н	Me	2-Et	4-Et
25	Et	4-C1	н	Me	2-Et	5-Et
	Et	4-MeO	н	Me	3-Et	4-Et
30	Et	4-Et0	н	Me	2-Me	5- <u>t</u> -Bu
	Et	4-CF3	н	Et	2-Me	4-Me
	н	2-Me	н	Et	2-Me	5-Me
35	н	2-Et	н	Et	3-Me	4-Me
33	н	2-C1	н	Et	2-Et	4-Et
	н	2-F	н	Et	2-Et	5-Et
	Н	2-OH	н	Et	3-Et	4-Et
40	Me	2-Me .	н	н	4-Ph	н
	Ме	2-C1	н	H	4-PhO	н
	Me	2-F	н	н	4- <u>c</u> -Hex	Н
45	Et	2-Me	н	H	4-Hex	н
	Et	2-C1	н	н	4- <u>n</u> -Amyl	Н
	Et	2-F	н	Me	4-Ph	H
	н	2-Me	4-Me	Me	4-PhO	н •

		R ² is H;	R ³ is Me; R ⁴	s M ; R	7 is H; R ¹⁸	is H
	$\mathbf{R^1}$	R ⁵	R ⁶	R ¹	R ⁵	R6
5	Me	4- <u>c</u> -Hex	н	H	3-NH ₂	H
	Me	4-Hex	н	н	4-NH ₂	H
	Me	4-n-Amyl	н	Me	3-NH ₂	н
10	H	3-C1	4-C1	Me	4-NH ₂	н
	Me	2-C1	4-C1	Et	3-NH ₂	н
	Me	2-C1	5-C1	Et	4-NH ₂	н
	Me	3-C1	4-C1	n-Pr	4-NMe ₂	H
15	Et	2-C1	4-C1	n-Pr	4-Me	н
	Et	2-C1	5-C1,	n-Pr	4-Et	н
	Et	3-C1 ·	4-C1	n-Pr	4-n-Pr	н
20	н	2-MeO	4-MeO	n-Pr	4-C1	H
	H	3-MeO	5-MeO	n-Pr	4-F	H
	н	3-MeO	4-MeO	n-Pr	4-Br	н
25	Me .	2-MeO	4-MeO	n-Pr	4-MeO	H
20	Me	3-MeO	5-MeO	n-Pr	4-EtO	Н
	Me	3-MeO	4-MeO	n-Pr	4-CF3	Н
	Et	2-MeO	4-MeO	n-Pr	4-CF3CH2O	н
30	Et	3-MeO	5-MeO	n-Pr	3-NMe ₂	H
	Et	3-MeO	4-MeO	n-Pr	3-Me	H
	H	3-Br	5-Br	n-Pr	3-Et	H
35	Me	3-Br	5-Br	N-br	3- <u>n</u> -Pr	Н
	Et	3-Br	5-Br	n-Pr	3-C1	н
	Н	3-Me	5-Me	n-Pr	3-F	н
	Me	3-Me	5-Me	n-Pr	3-Br	н
40	Et	3-Me	5-Me	n-Pr	3-MeO	H
	H	3-C1	4-MeO	n-Pr	3-EtO	H
	Me	3-C1	4-MeO	D-br	3-CF ₃	н
45	Et	3-C1	4-MeO	n-Pr	3-CF3CH2O	н
	Мө	4-NMe2	н	n-Pr	3-Me	4-Me
	Me	3-NMe ₂	н	n-Pr	3-Me	5-Me
50	Et	4-NMe ₂	н	n-Pr	3-C1	4-C1
	Et	3-NMe ₂	н	n-Pr	3-MeO	4-MeO

	•	R^2 is H;	R ³ is Me; R ⁴	is Me; R	7 is H; R ¹⁸ is H	
	R ¹	R ⁵	R6	B1	R ⁵	R6
5	n-Pr	3-MeO	5-MeO	i-Pr	4-MeO	H
	n-Pr	Ħ	н	1-Pr	4-EtO	н
	n-Bu	н	н	<u>i</u> -Pr	4-CF3	н
10	n-Bu	4-Me	н	i-Pr	4-CF3CH20	н
10	n-Bu	4-Et	н .	i-Pr	3-Me	4-Me
	n-Bu	4-n-Pr	н	1-Pr	3-Me	5-Me
	n-Bu	4- <u>1</u> -Pr	н	i-Pr	3-C1	4-C1
15	n-Bu	4-C1	н	i-Pr	3-MeO	4-MeO
	n-Bu	4-F	н ,	<u>i</u> -Pr	3-MeO	5-MeO
	<u>n</u> -Bu	4-Br	н	н	4-TMS	Н
20	n-Bu	4-MeO	н .	H	4-I	Н
	<u>n</u> ∽Bu	4-EtO	н	н	4- <u>t</u> -BuO	н
	n-Bu	4-CF3	н	H	4-CF3 (CH2) 30	H
	n-Bu	4-CF3CH2O	н	H	4-CF3 (CF2)2	H
25	n-Bu	3-Me	н	H	4-(CF ₃) ₂ CH	H
	n-Bu	3-Et .	н	н	4-CH ₃ CHC1CH	Н
	n-Bu	3-n-Pr	н	Me	4-TMS	H
30	n-Bu	3-C1	н	Me	4-I	H
	n-Bu	3-F	н	Me	4- <u>t</u> -BuO	H
	n-Bu	3-MeO	н	Me	4-CF ₃ (CH ₂) 30	н
35	n-Bu	3-EtO	н	н	4-MeS	H
33	n-Bu	3-CF3	н	H	4-EtS	H
	n-Bu	3-CF3CH2O	н	H	4-MeS (O)	н
	<u>i</u> -Pr	н	н	н	4-1-PrS(O)	н
40	i-Pr	4-Me	н	H	4-MeS (0) 2	Н
	<u>i</u> -Pr	4-Et	н	н	4-CH ₂ -CH	н
	<u>i</u> -Pr	4- <u>n</u> -Pr	н	н	4-CH ₂ -C (CH ₃) CH ₂)	H
45	i-Pr	4- <u>1</u> -Pr	н	H	4-CH ₂ -CHCH ₂ O	н
	<u>i</u> -Pr	4-C1	н	, н	4-MeOCH ₂ CH ₂	н
	i-Pr	4-F	н	H	4-MeOCH ₂ O	Н
50	<u>i</u> -Pr	4-Br	н		•	

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		R ² is H; R	3 is Me; R4 is	g-Pr;	R ⁷ is H; R ¹⁸	is H
	R ¹	B ⁵	R6	B1	B ⁵	R6
5	Н	н	н	H	3-C1	H
	н	4-NMe2	н	H	3-Br	H
	н	4-Me	н	H	3- F	H
10	н	4-Et	н	н	3-OH	Ħ
	H	4- <u>n</u> -Pr	H .	H	3-MeO	H
	н	4- <u>1</u> -Pr	H	H	3-EtO	H
	н	4- <u>n</u> -Bu	н	H	3-CF3	H
15	H	4- <u>sec</u> -Bu	н	Н	3-CF3CH2O	H
	н	4-1-Bu	н -	Me	3-M e	H
	H	4- <u>t</u> -Bu	н	Me	3-Et	H
20	н	4-C1	н .	Me	3- <u>1</u> -Pr	H
	н	4-Br	н	Me	3-C1	H
	н	4-F	н	Me	3-MeO	H
25	н	4-OH	н	Me	3-EtO	H
20	н	4-MeO	н	Me	3-CF3	H
	н	4-EtO	н	Et	3-Me	H
	н	4-CF3	н	Et	3-Et	H
30	н	4-CF3CH2O	н	Et	3- <u>i</u> -Pr	H
	Me	н	н	Et	3-C1	Н
	Me	4-Me	н	Et	4-Me	H
35	Me	4-Et	H	Et	4-Et	H
	Me	4- <u>i-</u> Pr	н	Et	4-1-Pr	Н
	Me	4-Cl	н	Et	4-C1	H
40	Me	4-MeO	н	Et	4-MeO	Н
40	Me	4-EtO	н	Et	4-EtO	H
	Me	4-CF3	H	Et	4-CF3	Н
	Et	н	н	H	2-Me	Н
45	Н	3-NMe ₂	н	H	2-Et	H
	H	3-Me	н	H	2-C1	H
	Н	3-Et	н	H	2-F	Н
50	H	3-n-Pr	н	н	2-OH	н .
	н	3- <u>i</u> -Pr	н	Me	2-M e	H

		R ² is H;	R ³ is Me; R ⁴ is	c-Pr; I	R ⁷ is H; R ¹⁸	15 H
	R1	B ⁵	R ⁶	R1	B ⁵	R6
5	H	3- <u>n</u> -Bu	н	Me	2-C1	н
	Me	2 -F	н	н	4-Hex	H
	Et	2-Me	н	н	4-n-Amyl	H
10	Et	2-C1	н	Me	4-Ph	н
	Et	2 -F	н .	Me	4-PhO	H
	н	2-Me	4-Me	Me	4-c-Hex	н
	н	2-Mo	5-Me	Me	4-Hex	н
15	н	3-Me	4-Me	Me	4-n-Amyl	н
	н	2-Et	4-Et	H	3-C1	4-C1
	н	2-Et	5-Et	Me	2-C1	4-C1
20	н	3-Et	4-Et	Me	2-C1	5-C1
	н	2-Me	5- <u>t</u> -Bu	Me	3-C1	4-C1
	н	2-C1	4-C1	Et	2-C1	4-Cl
25	н	2-C1	5-C1	Et	2-C1	5-C1
	Et	3-MeO	н	Et	3-C1	4-Cl
	Et	3-EtO	н	н	2-MeO	4-MeO
	Et	3-CF3	н	H	3-MeO	5-MeO
30	Me	2-Me	4-Me	H	3-MeO	4-MeO
	Me	2-Me	5-Me	Me	2-MeO	4-MeO
	Me	3-Me	4-Me	Me	3-MeO	5-MeO
35	Me	2-Et	4-Et	Me	3-MeO	4-MeO
	Me	2-Et	5-Et	Et	2-MeO	4-MeO
	Me	3-Et	4-Et	Et	3-MeO	5-MeO
40	Me	2-Me	5- <u>t</u> -Bu	Et	3-MeO	4-MeO
40	Et	2-Me	4-Me	н	3-Br	5-Br
	Et	2-Me	5-Me	Me	3-Br	5-Br
	Et	3-Me	4-Me	Et	3-Br	5-Br
45	Et.	2-Et	4-Et	Н	3∸Me	5-Me
	Et	2-Et	5-Et	Me	3-Me	5-Me
	Et	3-Et	4-Et	Et	3-Me	5-Me
50	н	4-Ph	н	Н	3-C1	4-MeO
	H	4-PhO	н	Me	3-C1	4-MeO
	н	4- <u>c</u> -Hex	н	Et	3-C1	4-MeO
	Me	4-NMe2	н	n-Pr	3-Me	5-Me

		R ² is H;	R ³ is Me; R ⁴ in	<u>c</u> -Pr;	R ⁷ is H; R ¹⁸	is H
	R ¹	R ⁵	R6	BI	R ⁵	R ⁶
5	Me	3-NMe ₂	н	n-Pr	3-C1	4-C1
	Et	4-NMe2	н	n-Pr	3-MeO	4-MeO
	Et ·	3-1Mo2	н	n-Pr	3-MeO	5-MeO
40	н	3-NH ₂	н	n-Pr	H	H
10	н	4-NH2	н	n-Bu	н	н
	Me	3-NH2	н	n-Bu	4-Me	H
	Me	4-NH2	н	n-Bu	4-Et	н
15	Et	3-NH2	н	n-Bu	4-n-Pr	н
	Et	4-NH2	н .	n-Bu	4- <u>1</u> -Pr	н
	n-Pr	4-NMe2	н	n-Bu	4-C1	н
20	n-Pr	4-Me	н .	n-Bu	4-F	H
	n-Pr	4-Et	н	n-Bu	4-Br	H
	n-Pr	4-n-Pr	н	n-Bu	4-Me0	H
	n-Pr	4-C1	н	n-Bu	4-EtO	н
25	n-Pr	4-F	н	n-Bu	4-CF3	н
	n-Pr	4-Br	н	<u>n</u> -Bu	4-CF3CH2O	H
	n-Pr	4-MeO	н	n-Bu	3-Me	н
30	n-Pr	4-EtO	н	n-Bu	3-Et	н
	n-Pr	4-CF3	н	<u>n</u> -Bu	3- <u>n</u> -Pr	н
	n-Pr	4-CF3CH2O	н	n-Bu	3-C1	H
35	n-Pr	3-NMe ₂	н	n-Bu	3-F	H
	n-Pr	3-Me	н	<u>n</u> -Bu	3-MeO	Н
	n-Pr	3-Et	н	n-Bu	3-EtO	H
	n-Pr	3- <u>n</u> -Pr	н	n-Bu	3-CF3	H
40	n-Pr	3-C1	н	n-Bu	3-CF3CH2O	н
	n-Pr	3-F	н	<u>i</u> -Pr	Н	H
	n-Pr	3-Br	н	<u>i</u> -Pr	4-Me	н
45	n-Pr	3-MeO	н	i-Pr	4-Et	H
	n-Pr	3-Et0	н	1-Pr	4-n-Pr	H
	n-Pr	3-CF3	н	i-Pr	4- <u>1</u> -Pr	H
50	n-Pr	3-CF3CH2O	н	i-Pr	4-C1	н .
~	n-Pr	3-Me	4-Me	<u>i</u> -Pr	4-F	H

		R ² is H;	R^3 is Me; R^4 i	s c-Pr;	\mathbb{R}^7 is H; \mathbb{R}^{18} is H	
	R1	R ⁵	R ⁶	R ¹	R ⁵	R6
5	i-Pr	4-Br	н	н	сн3снстсн	H
	1-Pr	4-MeO	н	Me	4-TMS	H
	1-Pr	4-EtO	н	Me	4-I	H
10	1-Pr	4-CF3	н	Me	4- <u>1</u> -BuO	H
,,	1-Pr	4-CF3CH2O	н	Me	4-CF3 (CH2) 30	H
	1-Pr	3 -Mo	4 -Mo	H	4-MeS	H
	1-Pr	3-Me	5-Me	н	4-EtS	H
15	i-Pr	3-C1	4-Cl	н	4-MeS (O)	H
	<u>1</u> -Pr	3-MeO	4-MeO _.	н	4-1-PrS(O)	H
	i-Pr	3-MeO	5-MeO	H -	4-MeS (O) 2	H
20	H	4-TMS	н .	н	4-CH ₂ -CH	н
	н	4-I	н	H	4-CH ₂ =C (CH ₃) CH ₂)	H
	н	4- <u>t</u> -BuO	н	H	4-CH ₂ =CHCH ₂ O	H
or.	н	4-CF3 (CH2) 30	н	Н	4-MeOCH ₂ CH ₂	н
25	н	4-CF3 (CF2)2	н	н	4-MeOCH ₂ O	Н
	н	4-(CF ₃) ₂ CH	н	8		
30		R ² is H;		1	R ⁷ is H; R ¹⁸ is H	_
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R6
	H	н	н	н	4-F	H
35	н	4-NMe ₂	н	H	4-OH	н
	н	4-Me	Н	H	4-MeO	н
	H	4-Et	н	н	4-EtO	н
	н	4- <u>n</u> -Pr	Н	н	4-CF3	H
40	н	4- <u>i</u> -Pr	н	Н	4-cr ₃ cH ₂ o	н
	H	4-n-Bu	н	Me	Н	н
	H	4- <u>sec</u> -Bu	н	Me	4-Me	H
45	н	4- <u>1</u> -Bu	н	Me	4-Et	н
	н	4- <u>t</u> -Bu	н	Me	4- <u>1</u> -Pr	H
	H	4-C1	н	Me	4-C1	H
50	н	4-Br	н	Me	4-MeO ·	H
= =	Me	4-EtO	н	Et	4-CF3	Н
		•				

		R ² is H;	R ³ is Me; R ⁴	is Et; R ⁷	is H; R^{18} is H	
	R ¹	R ⁵	R ⁶	R1	R ⁵	R ⁶
5	Me	4-CF3	н	н	2-Me	H
	Et	H	H.	н	2-Et	H
	н	3-NMe2	н	н	2-C1	H
10	н	3-Me	н	H	2- F	H
	н	3-Et	н	H	2-OH	H
	н	3-p-Pr	н	Me	2-M o	н .
	н	3-1-Pr	н	Me	2-C1	H
15	H	3- 2- Bu	н	Me	2- F	н
	н	3-C1	н .	Et	2-M o	H
	н	3-Br	н	Et	2-C1	H
20	н	3-F	н .	Et	2-F	H
	н	3-0H	н	н	2-Me	4-Me
	н	3-MeO	н	н	2-Me	5-Me
	н	3-EtO	н	н	3-Me	4-Me
25	н	3-CF3	н	н	2-Et	4-Et
	н	3-CF3CH2O	н	H	2-Et	5-Et
	Me	3-Me	н	H	3-Et	4-Et
30	Me	3-Et	н	Н	2-Me	5- <u>t</u> -Bu
	Me	3- <u>i</u> -Pr	н	н	2-C1	4-C1
	Me	3-C1	н	H	2-C1	5-C1
35	Me	3-MeO	н	Et	3-MeO	H
	Me	3-EtO	н	Et	3-EtO	H
	Me	3-CF3	н	Et	CF3	н
	Et	3-Me	н	Me	2-Me	4-Me
40	Et	3-Et	н	Me	2-Ma	5-Me
	Et	3- <u>i</u> -Pr	н	Me	3-Me	4-Me
	Et	3-C1	н	Me ·	2-Et	4-Et
45	Et	4-Me	н	Me	2-Et	5-Et
	Et	4-Et	н	Me	3-Et	4-Et
	Et	4- <u>i</u> -Pr	н	Me	2-Me	5- <u>t</u> -Bu
50	Et	4-C1	н	Et	2-Me ·	4-Me
	Et	4-MeO	н	Et	2-Me	5-Me
					•	

		R ² is	H; R ³ is Mo;	R ⁴ i	s Et;	R ⁷ is H; R ¹⁸	is H
	R1	R ⁵	R ⁶		R1	R ⁵	R6
5	Et	4-EtO	н	- 1	Et	3-Me	4-Me
•	Et	2-Et	4-Et	1	Me	3-Me	5-Me
	Et	2-Et	5-Et	. 1	Et	3-Me	5-Me
-	Et	3-Et	4-Et		H	3-C1	4-Me0
10	н	4-Ph	н .		Mo	3-C1	4-Me0
	н	4-Ph0	н		Et	3-C1	4-Me0
	H	4-g-Hex	н		Me	4-NMe2	H
15	H	4-Hex	н		Me	3-NMe2	н
	н	4-n-Amyl	н		Et	4-NMe2	H
	Me	4-Ph	н .		Et	3-NMe2	н
20	Me	4-Ph0	н .		Н	3-NH ₂	H
20	Me	4- <u>c</u> -Hex	H	.	H	4-NH ₂	Н
	Me	4-Hex	H		Me	3-NH ₂	н
25	Me	4-n-Amyl	н		Me	4-NH ₂	Н
	н	3-C1	4-C1		Et	3-NH ₂	н
	ме	2-C1	4-C1		Et	4-NH ₂	H
	Me	2-C1	5-C1		<u>n</u> -Pr	4-NMe ₂	Н
30	Me	3-C1	4-C1		n-Pr	4-Me	н
	Et	2-C1	4-C1		n-Pr	4-Et	H
	Et	2-C1	5-C1	- 1	n-Pr	4-n-Pr	н
25	Et	3-C1	4-C1		n-Pr	4-C1	н
35	H	2-MeO	4-MeO		n-Pr	4-F	H
	H	3-MeO	5-MeO		n-Pr	4-Br	Н
	н	3-MeO	4-MeO	ł	n-Pr	4-MeO	Н
40	Me	2-MeO	4-MeO		n-Pr	4-EtO	Н
	Me	3-MeO	5-MeO		n-Pr	4-CF3	H
	Me	3-MeO	4-MeO	- 1	n-Pr	4-CF3CH20	Н
45	Et	2-MeO	4-MeO	ŀ	n-Pr	3-NMe ₂	Н
	Et	3-MeO	5-MeO	1	<u>n</u> -Pr	3-Me	н
	Et	3-MeO	4-MeO	1	n-Pr	3-Et	Н
	н	3-Br	5-Br		n-Pr	3-n-Pr	н .
50	Me	3-Br	5-Br		n-Pr	3-C1	н
	Et	3-Br ·	5-Br		n-Pr	3-F	н
	н	3-Me	5-Me	11.	n-Pr	3-Br	н

	R^2 is H; R^3 is Me; R^4 is Et; R^7 is H; R^{18} is H									
	R ¹	B ⁵	R ⁶	R ¹	B ⁵	B ⁶				
5	n-Pr	3-MeO	н	<u>1</u> -Pr	4- <u>i</u> -Pr	H				
	n-Pr	3-EtO	н	1-Pr	4-C1	H				
	n-Pr	3-cr ₃	н	1-Pr	4-F	H				
10	n-Pr	3-CF3CH2O	н	1-Pr	4-Br	H				
	n-Pr	3-Me	4-Me	i-Pr	4-MeO	н				
	n-Pr	3-Me	5-Me	<u>1</u> -Pr	4-EtO	H				
.2	n-Pr	3-C1	4-C1	<u>i</u> -Pr	4-CF3	H				
15	n-Pr	3-MeO	4-MeO	i-Pr	4-CF3CH20	H				
	n-Pr	3-MeO	5-MeO .	<u>1</u> -Pr	3-Me	4-Me				
	n-Pr	H	н	<u>i</u> -Pr	3-Me	5-Me				
20	n-Bu	H	H ·	i-Pr	3-C1	4-C1				
	n-Bu	4-Me	H	<u>i</u> -Pr	3-MeO	4-MeO				
	n-Bu	4-Et	н	i-Pr	3-MeO	5-MeO				
25	n-Bu	4-n-Pr	н	н	4-IMS	H				
	n-Bu	4- <u>1</u> -Pr	н	н	4-I	H				
	n-Bu	4-C1	Н	н	4- <u>t</u> -BuO	н				
	n-Bu	4-F	н	Н	4-CF3 (CH2) 30	н				
30	n-Bu	4-Br	н	н	4-CF3 (CF2)2	н				
	n-Bu	4-MeO	н	н	4-(CF ₃) ₂ CH	H				
	n-Bu	4-EtO	н	H	4-CH3CHC1CH	Н				
35	n-Bu	4-CF3	н	Me	4-TMS	Н				
	n-Bu	4-CF3CH2O	н	Me	4-I	H				
	<u>n</u> -Bu	3-Me	н	Me	4- <u>t</u> -BuO	H				
40	n-Bu	3-Et	н	Me	4-CF3 (CH2) 30	н				
40	n-Bu	3-n-Pr	н	н	4-MeS	Н				
	n-Bu	3-Cl	н	H	4-EtS	Н				
	n-Bu	3-F	н	H	4-MeS (0)	Н				
45	n-Bu	3-MeO	Н	H	4-1-PIS (O)	н				
	n-Bu	3-EtO	н	H	4-MeS (0) 2	н				
	n-Bu	3-CF3	н	н	4-CH ₂ -CH	Н				
50	n-Bu	3-CF3CH2O	н	H	4-CH ₂ =C (CH ₃) CH ₂)	Н				
	<u>i</u> -Pr	H	н	н	4-CH ₂ -CHCH ₂ O	н				
	i-Pr	4-Me	н	н	4-MeOCH ₂ CH ₂	н .				
	<u>i</u> -Pr	4-Et	н	H	4~MeOCH ₂ O	н				
55	<u>i-Pr</u>	4-n-Pr	н							

		R ² 15	3	н;	R ³	is	Et;	R4	18	Et;	R ⁷ is H; F	18 is H
	R1	R ⁵		₈ 6						B1	R ⁵	\mathbb{R}^6
5	H	н	1	Ħ						H	3- <u>n</u> -Bu	н
	H	4-1Mo2	3	H						н	3-C1	н
	н	4-Me	1	Ħ						H	3-Br	H
10	H	4-Et	1	H						H	3-F	H
	н	4- <u>n</u> -Pr	1	Ħ						H	3-OH	H
	н	4-1-Pr	1	Н						H	3-MeO	H
	н	4- <u>n</u> -Bu	1	H						н	3-EtO	H
15	H	4- <u>sec</u> -Bu	1	H						H	3-CF3	H
	н	4-1-Bu	1	H						н	3-CF3CH2O	H
	Н	4- <u>t</u> -Bu	1	H						Me	3-Me	H
20	H	4-C1	1	H						Me	3-Et	н
	H	4-Br]	H						Me	3-1-Pr	H
	н	4-F	1	H						Me	3-C1	H
25	н	4-OH	1	Н						Me	3-MeO	Н
	H	4-MeO	1	H						Me	3-EtO	H
	н	4-EtO	.1	H						Me	3-CF3	н
	H	4-CF3	1	H						Et	3-Me	Н
30	Н	4-CF3CH2O	1	H						Et	3-Et	Н
	Me	Н	3	H						Et	3- <u>i</u> -Pr	Н
	Me	4-Me	1	H						Et	3-C1	н
35	Ме	4-Et	1	H						Et	4-Me	н
	Ме	4- <u>i</u> -Pr	,1	H						Et	4-Et	н
	Me	4-C1	1	H						Et	4- <u>i</u> -Pr	H
40	ме	4-MeO	1	H						Et	4-C1	H
40	Me	4-EtO	1	H						Et	4-MeO	н
	Me	4-CF3	1	H						Et	4-EtO	H
	Et	Н	1	H						Et	4-CF3	H
45	н	3-NMe ₂	1	H						H	2-Me	H
	н	3-Me	1	H						Н	2-Et	H
	Н	3-Et	1	H						H	2-C1	н
50	H	3-n-Pr	1	H						н	2-F	н .
	H	3- <u>1</u> -Pr	1	Ħ						н	2-ОН	H

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		R ² 1s	H; R ³ i	s Et;	R4 1	Et;	R ⁷ is H;	R ¹⁸ is H
	R ¹	B ⁵	R ⁶			R1	R ⁵	\mathbb{R}^6
5	Me	2-Me	н			H	4-Ph	H
	Me	2-C1	н		- 1	н	4-PhO	н
	Me	2- F	н			H	4-g-Hex	H
	Et	2-Me	н			H	4-Hex	H
10	Et	2-C1	H			H	4-p-Amyl	H
	Et	2-F	н			Me	4-Ph	Н
	H	2-Me	4-Me			Me	4-PhO	н
15	н	2-Me	5-Me		-	Me	4- <u>c</u> -Hex	н
	H	3-Me	4-Me			Me	4-Hex	н
	H	2-Et	4-Et			Me	4-n-Amyl	Н
20	н	2-Et	5-Et			н	3-C1	4-C1
	н	3-Et	4-Et			Me	2-Cl	4-C1
	H	2-Me	5- <u>t</u> -Bu		- 1	Me	2-C1	5-C1
	H	2-C1	4-C1			Me	3-C1	4-C1
25	Н	2-C1	5-Cl			Et	2-C1	4-C1
	Et	3-MeO	·H		Į	Et	2-C1	5-C1
	Et	3-EtO	H			Et	3-C1	4-C1
30	Et	3-CF ₃	н			H	2-MeO	4-MeO
	Me	2-Me	4-Me			н	3-MeO	5-MeO
	Me	2-Me	5-Me			H	3-MeO	4-MeO
35	Me	3-Me	4-Me			Me	2-MeO	4-MeO
33	Me	2-Et	4-Et			Me	3-MeO	5-MeO
	Me	2-Et	5-Et	•		Me	3-MeO	4-MeO
	ме	3-Et	4-Et			Et	2-MeO	4-MeO
40	Me	2-Me	5- <u>t</u> -Bu			Et	3-MeO	5-MeO
	Et	2-Me	4-Me			Et	3-MeO	4-MeO
	Et	2-Me	5-Me			н	3-Br	5-Br
45	Et	3-Me	4-Me			Me	3-Br	5-Br
	Et	2-Et	4-Et			Et	3-Br	5-Br
	Et	2-Et	5-Et			H	3-Me	5-Me
50	Et	3-Et	4-Et			Me	3-Me	5-Me ·

		R^2 is	H; R ³ is Et; R ⁴	is Et; R	7 is H; R ¹⁸	is H
	R^1	R ⁵	R ⁶	R1	r ⁵	R ⁶
5	Et	3-Me	5-Me	n-Pr	3-MeO	H
	н	3-C1	4-MeO	n-Pr	3-EtO	H
	Me	3-C1	4-MeO	n-Pr	3-CF ₃	н
10	Et	3-C1	4-MeO	n-Pr	3-CF ₃ CH ₂ O	Н
	Me	4-NMe2	н .	n-Pr	3-Me	4-Mo
	Me	3-NMe2	н	n-Pr	3-Ma	5-Ma
	Et	4-NMe2	н	n-Pr	3-C1	4-Cl
15	Et	3-NMe2	н	n-Pr	3-MeO	4-MeO
	н	3-NH ₂	H .	n-Pr	3-MeO	5-MeO
·	н	4-NH2	н	n-Pr	H	н
20	Me	3-NH ₂	н	n-Bu	н	Н
	Me	4-NH ₂	н	n-Bu	4-Me	Н
	Et	3-NH ₂	н	n-Bu	4-Et	Н
25	Et	4-NH ₂	н	n-Bu	4-n-Pr	Н
	n-Pr	4-NMe2	н	n-Bu	4-1-Pr	н
	n-Pr	4-Me	н	<u>n</u> -Bu	4-C1	н
	n-Pr	4-Et	н	n-Bu	4-F	H
30	n-Pr	4-n-Pr	н	n-Bu	4-Br	Н
	n-Pr	4-C1	н	n-Bu	4-MeO	Н
	n-Pr	4-F	н	ಗ್ರ−B ಬ	4-EtO	Н
35	n-Pr	4-Br	н	<u>n</u> -Bu	4-CF3	Н
	n-Pr	4-MeO	н	Ŋ−Bu '	4-CF3CH2O	н
	n-Pr	4-EtO	н	n-Bu	3-Me	н
40	n-Pr	4-CF3	н	n-Bu	3-Et	Н
**	n-Pr	4-CF3CH2O	н	n-Bu	3- <u>n</u> -Pr	Н
	n-Pr	3-NMe2	н	n-Bu	3-C1	Н
	N-bx	3-Me	Н	n-Bu	3-F .	H
45	n-Pr	3-Et	Н	n-Bu	3-MeO	Н
	n-Pr	3- <u>n</u> -Pr	н	n-Bu	3-EtO	H
	n-Pr	3-C1	н	n-Bu	3-CF3	H
50	n-Pr	3-F	н	n-Bu	3-CF3CH2O	н
	n-Pr	3-Br	н	i-Pr	н	н

		\mathbb{R}^2 is	H; R ³ is Et; R ⁴	is Et;	R^7 is H; R^{18} is H	
	R1	B ⁵	R ⁶	B1	R ⁵	R6
5	<u>i</u> -Pr	4-Me	н	н	4-CF3 (CH2) 30	H
	i-Pr	4-Et	н	н	4-CF3 (CF2) 2	H
	<u>i</u> -Pr	4-n-Pr	H	H	4-(CF3)2CH	H
	i-Pr	4- <u>i</u> -Pr	н	Я	4-снзсистси	H
10	i-Pr	4-C1	н .	Me	4-TMS	H
	<u>i-Pr</u>	4-F	н	Me	4-I	H
	1-Pr	4-Br	н	Me	4-t-BuO	H
15	<u>i</u> -Pr	4-MeO	н	Me	4-CF ₃ (CH ₂) 30	H
	<u>i-Pr</u>	4-EtO	н	н	4-MeS	H
	<u>i</u> -Pr	4-CF3	н .	н	4-EtS	H
20	<u>i</u> -Pr	4-CF3CH2O	н .	H	4-MeS (O)	Н
	<u>i-Pr</u>	3-Me	4-Me	Н	4-1-Prs (O)	н
	<u>i-Pr</u>	3-Ме	5-Me	Н	4-MeS (O) 2	H
	<u>i</u> -Pr	3-C1	4-C1	н	4-CH ₂ -CH	н
25	<u>i</u> -Pr	3-MeO	4-MeO	н	4-CH ₂ -C (CH ₃) CH ₂)	H
	<u>i</u> -Pr	3-MeO	5-MeO	н	4-CH ₂ -CHCH ₂ O	Н
	Н	4-TMS	н	H	4-MeOCH ₂ CH ₂	H
30	H	4-I	н	H	4-MeOCH ₂ O	H
	н	4- <u>t</u> -BuO	н			
		R ² is H	ı; R ³ is Me; R ⁴ i	s i-Pr;	R ⁷ is H; R ¹⁸ is F	i
35	R1	R ⁵	R ⁶	R1	R ⁵	R6
	н	н	н	H	4- <u>i</u> -Bu	н
	н	4-NMe2	н	н	4- <u>t</u> -Bu	H
40	н	4-Me	н	н	4-C1	н
	н	4-Et	н	н	4-Br	н
	н	4- <u>n</u> -Pr	н	н	4-F	H
45	н	4- <u>i</u> -Pr	н	н	4-OH	H
	н	4-n-Bu	н	н	4-MeO	H
	н	4- <u>sec</u> -Bu	н	н	4-EtO	Н

		R^2 is H;	R ³ is Me; R ⁴ is	<u>1</u> -Pr;	R ⁷ is H; R ¹	.8 is H
	R^1	B ⁵	R6	R1	R ⁵	R6
5	н	4-CF3	н	Et	3-Ma	н
_	н	4-CF3CH2O	н	Et	3-Et	н
	Мө	н	н	Et .	3-1-Pr	H
	Me	4-Mo	н	Et	3-C1	H
10	Me	4-Et	н	Et	4-M o	н
	Me	4- <u>i</u> -Pr	н	Et	4-Et	H
	Me	4-C1	н	Et	4- <u>1</u> -Pr	H
15	Me	4-Me0	н	Et	4-C1	H
	Me	4-EtO	н	Et	4- Me O	Н
	Me	4-CF3	н	Et	4-EtO	н
20	Et	H	н .	Et	4-CF3	н
2.0	H	3-NMe ₂	н	H	2-Me	H
	н	3-Me	н	Н	2-Et	Н
	н	3-Et	н	H	2-C1	H
25	Н	3- n -Pr	н	H	2-F	н
	н	3- <u>i</u> -Pr	н	H	2-OH	H
	н	3- <u>n</u> -Bu	н	Me	2-Me	Н
30	н	3-C1	н	Me	2-C1	H
	H	3-Br	н	Me	2-F	Н
	н	3-F	н	Et	2-Me	н
05	н	3-0H	Н	Et,	2-C1	Н
35	н	3-Me0	н	Et	2-F	Н
	н	3-EtO	н	H	2-Me	4-Me
	H	3-CF ₃	н	H	2-Me	5-Me
40	H	3-CF3CH2O	н	H	3-Me	4-Me
	Me	3-Me	н	Н	2-Et	4-Et
	Me	3-Et	н	H	2-Et	5-Et
45	Me	3- <u>i</u> -Pr	Н	H	3-Et	4-Et
	Me	3-C1	н	H	2-Me	5- <u>t</u> -Bu
	Me	3-MeO	н	н	2-C1	4-C1
	Ме	3-EtO	н	H	2-C1	5-C1
50	Me	3-CF3	н	Et	3-MeO	H

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		R ² is	H; R ³ is Me; R ⁴ is	1-Pr;	R ⁷ is H; R ¹	.8 is H
	R1	R ⁵	R ⁶	B1	B ⁵	R ⁶
5	Et	3-EtO	н	н	2-MeO	4-MeO
5	Et	CF3	н	н	3-MeO	5-MeO
	Me	2-Me	4-Mo	н	3-MeO	4-MeO
	Me	2-Me	5-Me	Me	2-MeO	4-MeO
10	Me	3-Me	4-Me	Me	3-MeO	5-MeO
	Me	2-Et	4-Et	Me	3-MeO	4-MeO
	Me	2-Et	5-Et	Et	2-MeO	4-MeO
15	Me	3-Et	4-Et	Et	3-MeO	5-MeO
	Me	2-Me	5- <u>t</u> -Bu	Et	3-MeO	4-MeO
	Et	2-Me .	4-Me	Н	3-Br	5-Br
20	Et	2-Me	5-Me .	Me	3-Br	5-Br
20	Et	3-Me	4-Me	Et	3-Br	5-Br
	Et	2-Et	4-Et	H	3-Me	5-Me
	Et	2-Et	5-Et	Me	3-Me	5-Me
25	Et	3-Et	4-Et	Et	3-Me	5-Me
	н	4-Ph	H	H	3-C1	4-MeO
	н	4-PhO	н	Me	3-C1	4-MeO
30	H	4- <u>c</u> -Hex	Н	Et	3-C1	4-MeO
	Н	4-Hex	н	Me	4-NMe ₂	H
	н	4-n-Amyl	н	Me	3-NMe ₂	H
35	Me	4-Ph	н	Et	4-NMe ₂	н
30	Me	4-PhO	н	Et	3-NMe ₂	Н
	Me	4- <u>с</u> -Неж	н	H	3-NH ₂	H
	Me	4-Hex	Н	H	4-NH ₂	Н
40	Me	4-n-Amyl	Н	Me	3-NH ₂	H
	H	3-C1	4-C1	Me	4-NH ₂	н
	Me	2-C1	4-C1	Et	3-NH ₂	H
45	Me	2-C1	5-C1	Et	4-NH ₂	H
	Me	3-C1	4-C1	D-Pr	4-NMe ₂	H
	Et	2-C1	4-C1	<u>n</u> -Pr	4-Me	H
	Et	2-C1	5-C1	n-Pr	4-Et	H .
50	Et	3-C1	4-C1	n-Pr	4- <u>n</u> -Pr	Н

		R ² is H;	R ³ is Me; R ⁴ is	1-Pr;	R ⁷ is H; R ¹	8 is H
	R1	B ⁵	R ⁶	R ¹	R ⁵	R6
5	n-Pr	4-C1	н	n-Bu	4-MeO	H
	n-Pr	4-F	н	n-Bu	4-Et0	H
	n-Pr	4-Br	н	n-Bu	4-CF3	H
10	n-Pr	4-MeO	н	n-Bu	4-CF3CH2O	H
	n-Pr	4-EtO	н .	n-Bu	3-He	H
	n-Pr	4-CF3	н.	n-Bu	3-Et	H
	n-Pr	4-CF3CH2O	н	n-Bu	3- <u>n</u> -Pr	H
15	n-Pr	3-NMe2	н	n-Bu	3-C1	H
	n-Pr	3-Me	н.	n-Bu	3- F	H
	n-Pr	3-Et	н	n-Bu	3-MeO	н
20	n-Pr	3-n-Pr	н .	n-Bu	3-EtO	H
	n-Pr	3-C1	н	n-Bu	3-CF3	Ħ
	n-Pr	3-F	Н	n-Bu	3-CF3CH2O	H
25	n-Pr	3-Br	н	i-Pr	H	H
20	n-Pr	3-MeO	н	<u>i</u> -Pr	4-Me	Н
	n-Pr	3-EtO	н	<u>i</u> -Pr	4-Et	H
	n-Pr	3-CF3	н	i-Pr	4-n-Pr	Н
30	n-Pr	3-CF3CH2O	н	<u>i</u> -Pr	4- <u>1</u> -Pr	Н
	n-Pr	3-Me	4-Me	1-Pr	4-C1	H
	n-Pr	3-Me	5-Me	<u>i</u> -Pr	4-F	H
35	n-Pr	3-C1	4-C1	i-Pr	4-Br	н
	n-Pr	3-MeO	4-MeO	<u>i</u> -Pr	4-MeO	Н
	n-Pr	3-MeO	5-Me0	<u>i</u> -Pr	4-EtO	Н
40	n-Pr	н	н	<u>i</u> -Pr	4-CF3	H
40	n-Bu	н	н	1-Pr	4-CF3CH2O	Н
	n-Bu	4-Me	н	<u>i</u> -Pr	3-Me	4-Me
	n-Bu	4-Et	н	<u>i</u> -Pr	3-Me	5-Me
45	n-Bu	4-n-Pr	н	i-Pr	3-C1	4-C1
	n-Bu	4- <u>i</u> -Pr	н	1-Pr	3-МеО	4-MeO
	n-Bu	4-C1	н	<u>i</u> -Pr	3-MeO	5-MeO
50	n-Bu	4-F	н	н	4-TMS	н •
	n-Bu	4-Br	н	н	4~I	Н

					\mathbb{R}^7 is H; \mathbb{R}^{18} is H	,
	•		R ⁶	R ¹	R ⁵	Re
	B1	R ⁵				H
Б	H	4- <u>t</u> -BuO	н	Н	4-EtS	
	H	4-CF3 (CH2) 30	н	H	4-MeS (0)	H
	н	4-CF3 (CF2)2	н	H	4- <u>1</u> -Prs(0)	H
10	H	4-(CF3)2CH	н	н	4-MeS (0) 2	H
	н	4-CH3CHC1CH	н	H	4-CH ₂ =CH	H
	Me	4-TMS	н	н	4-CH ₂ =C (CH ₃) CH ₂)	H
	Me	4-I	н	H	4-CH ₂ -CHCH ₂ O	H
15	Me	4-t-BuO	н	H	4-MeOCH ₂ CH ₂	H
	Me	4-CF3 (CH2) 30	н .	H	4-MeOCH ₂ O	H
	н	4-MeS	н			
20						
		R ² is H; F	3 is Me; R4	is H; H	R^7 is H; R^{18} is H	
	R ¹	R ⁵	R ⁶	R1	R ⁵	R6
	н	н	н	н	4-CF3CH2O	H
25	н	4-NMe ₂	н	Me	H	H
	H	4-Me	н	Me	4-Me	H
	н	4-Et	н	Me	4-Et	H
30	Ħ	4- <u>n</u> -Pr	н	Me	4- <u>i</u> -Pr	H
	Н	4- <u>1</u> -Pr	н	Me	4-C1	H
	н	4-n-Bu	н	Me	4-MeO	H
35	н	4- <u>sec</u> -Bu	н	Me	4-EtO	H
	н	4-1-Bu	н	Me	4-CF ₃	H
	н	4- <u>t</u> -Bu	н	Et	н	H
	н	4-C1	н	н	3-NMe ₂	H
40	H	4-Br	н	H	3-Me	H
	H	4-F	н	Н	3-Et	H
	H.	4-OH	н	н	3- <u>n</u> -Pr	H
45	н	4-MeO	н	H	3- <u>1</u> -Pr	H
	н	4-EtO	н	Н	3- <u>n</u> -Bu	H
	н	4-CF3	н	H	3-C1	H

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		R ² 1s	H; R ³ is Me; R	is H;	R ⁷ is H; R	18 is H
	B1	R ⁵	R6 .	B1	B ⁵	R6
E	н	3-Br	H	Me	2-M o	H
5	н	3-F	H	Me	2-C1	H
	н	3-OH	H	Mo	2-F	H
	H.	3 -Me O	H	Et	2-Me	H
10	H	3-EtO	H .	Et	2-C1	H
	н	3-CF3	H	Et	2-F	H
	н	3-CF3CH2O	н	н	2-Me	4-Me
15	Me	3-Me	H	H	2-Me	5-Me
	Me	3-Et	H	н	3-Me	4-Ma
	Me	3-1-Pr	H .	н	2-Et	4-Et
	Me	3-C1	H .	н	2-Et	5-Et
20	Me	3-MeO	н	н	3-Et	4-Et
	Me	3-EtO	H	н	2-Me	5- <u>L</u> -Bu
	Me	3-CF3	H	н	2-C1	4-C1
25	Et	3-Me	H	н	2-C1	5-C1
	Et	3-Et	H	Et	3-MeO	н
	Et	3- <u>1</u> -Pr	H	Et	3-EtO	Н
30	Et	3-C1	н	Et	3-CF3	Н
30	Et	4-Me	н	Me	2-Me	4-Me
	Et	4-Et	н	Me	2-Me	5-Me
	Et	4-1-Pr	H	Me	3-Me	4-Me
35	Et	4-C1	н	Me	2-Et	4-Et
	Et	4-MeO	н	Me	2-Et	5-Et
	Et	4-EtO	Н	Me	3-Et	4-Et
40	Et	4-CF3	н	Me	2~Me	5- <u>t</u> -Bu
	н	2-Me	н	Et	2-Me	4-Me
	н	2-Et	н	Et	2-Me	5-Me
45	н	2-C1	н	Et	3-Me	4-Me
45	н	2-F	н	Et	2-Et	4-Et
	н	. 2-OH	н	Et	2-Et	5-Et

		R ² is	H; R ³ is Me; R ⁴	1s H; R ⁷	is H; R ¹⁸	is H
	\mathbb{R}^1	R ⁵	₽6	R ¹	R ⁵	B 6
5	Et	3-Et	4-Et	н	3-C1	4-MeO
	н	4-Ph	н	Me	3-C1	4-MeO
	н	4-PhO	н	Et	3-C1	4-MeO
10	н	4-g-Hex	н	Me	4-NMe2	H
	н	4-Hex	н .	Me	3-NMe2	H
	н	4-n-Amyl	н	Et	4-NMe2	H
	Me	4-Ph	H	Et	3-NMe ₂	H
15	Me	4-PhO	H	Н	3-NH ₂	H
	Me	4- <u>c</u> -Hex	н .	н	4-NH ₂	H
	Me	4-Hex	H	Me	3-NH ₂	H
20	Me	4-n-Amyl	н .	Me	4-NH ₂	н
	н	3-C1	4-C1	Et	3-NH ₂	Н
	Me	2-C1	4-Cl	Et	4-NH ₂	н
25	Me	2-C1	5-Cl	n-Pr	4-NMe2	н
20	Me	3-C1	4-Cl	n-Pr	4-Me	н
	Et	2-C1	4-Cl	<u>n</u> -Pr	4-Et	Н
	Et	2-C1	5-C1	n-Pr	4-n-Pr	н
30	Et	3-C1	4-Cl	n-Pr	4-Cl	н
	H	2-MeO	4-MeO	n-Pr	4-F	н
	Н	3-MeO	5-MeO	n-Pr	4-Br	H
35	H	3-MeO	4-Me0	n-Pr	4-MeO	н
	Me	2-MeO	4-Me0	n-Pr	4-EtO	н
	Me	3-Me0	5-Me0	n-Pr	4-CF3	Н
40	Me	3-MeO	4-Me0	n-Pr	4-CF3CH2O	н
40	Et	2-MeO	4-Me0	n-Pr	3-NMe2	H
	Et.	3-MeO	5-MeO	n-Pr	3-Me	Н
	Et	3-MeO	4-Me0	n-Pr	3-Et	H
45	н	3-B=	5-Br	n-Pr	3- <u>n</u> -Pr	н
	Me	3-Br	5-Br	n-Pr	3-C1	Н
	Et	3-Br	5-Br	n-Pr	3-F	H
50	Н	3-Me	5-Me	n-Pr	3-Br	н .
	Me	3-Me	5-Me	n-Pr	3-MeO	H

		R ² is H;	R3 is Me; R4	is H; R ⁷	is H; R18 is	н
	R ¹	R ⁵	R6	R ¹	R ⁵	R ₆
5	Et	3-Me	5-Me	n-Pr	3-EtO	H
	n-Pr	3-CF3	н	1-Pr	4- <u>1</u> -Pr	H
	n-Pr	3-CF3CH2O	н	1-Pr	4-Cl	H
	n-Pr	3-Me	4-Me	1-Pr	4-F	Ħ
10	n-Pr	3-Mo	5-Me	i-Pr	4-Br	Я
	n-Pr	3-C1	4-C1	<u>i</u> -Pr	4-MeO	Я
	n-Pr	3-MeO	4-MeO	1-Pr	4-EtO	H
15	n-Pr	3-MeO	5-MeO	<u>i-Pr</u>	4-Cr ₃	H
	n-Pr	н	н	i-Pr	4-CF3CH2O	H
	n-Bu	н	н	1-Pr	3-Me	4-Me
20	n-Bu	4-Me	н .	1-Pr	3-Me	5-Me
	n-Bu	4-Et	н	<u>i</u> -Pr	3-C1	4-C1
	n-Bu	4-n-Pr	H (c)	i-Pr	3-MeO	4-MeO
	n-Bu	4- <u>i</u> -Pr	н	1-Pr	3-MeO	5-MeO
25	д-Ви	4-C1	н	H	4-TMS	н
	n-Bu	4-F	н	H	4-1	Н
	n-Bu	4-Br	н	H	4- <u>t</u> -BuO	H
30	n-Bu	4-MeO	н	н	4-CF3 (CH2) 30	н
	n-Bu	4-EtO	н	n-Bu	4-CF3	H
	<u>n</u> -Bu	4-CF3	н	n-Bu	4-CF3CH2O	Н
35	n-Bu	4-CF3CH2O	н	n-Bu	3-Me	H
33	n-Bu	3-Me	н	n-Bu	3-Et	н
	<u>n</u> -Bu	3-Et	н	n-Bu	3- <u>n</u> -Pr	Н
	n-Bu	3-n-Pr	н	n-Bu	3-C1	H
40	n-Bu	3-C1	н	n-Bu	3-F	н
	n-Bu	3-F	н	n-Bu	3-MeO	н
	n-Bu	3-MeO	н	n-Bu	3-EtO	н
45	n-Bu	3-EtO	Н	n-Bu	3-CF ₃	Н
	<u>n</u> -Bu	3-CF3	н	n-Bu	3-CF ₃ CH ₂ O	Н
	n-Bu	3-CF3CH2O	н	1-Pr	н	Н
	<u>i</u> -Pr	н	н	<u>i</u> -Pr	4-Me	H
50	<u>i</u> -Pr	4-Me	н	1-Pr	4-Et	н
	i-Pr	4-Et .	н	<u>i</u> -Pr	4-n-Pr	н .
	i-Pr	4- <u>n</u> -Pr	н 1	1-Pr	4- <u>1</u> -Pr	Н

	. '	R ² is H;	R3 is Me; R4	is H; R	is H; R ¹⁸ is H	
	R ¹	R ⁵	R ⁶	B1	R ⁵	R6
5	i-Pr	4-C1	н	H	4-(CF3) 2CH	H
	i-Pr	4-r	н	H	4-CH3CHC1CH	H
	i-Pr	4-Br	н	Не	4-TMS	H
10	<u>i</u> -Pr	4-Me0	н	Mo	4-I	H
	i-Pr	4-EtO	н	Mo	4- <u>±</u> -BuO	H
	i-Pr	4-CF3	н ,	Me	4-CF3 (CH2) 30	H
15	1-Pr	4-cr ₃ ch ₂ o	н	н	4-MeS	Н
10	i-Pr	3-Me	4-Me	н	4-EtS	H
	i-Pr	3-Me	5-Me	н	4-MeS (O)	н
	i-Pr	3-C1	4-C1	н	4-1-PrS(O)	н
20	i-Pr	3-MeO	4-MeO	н	4-MeS (0) 2	н
	i-Pr	3-MeO	5-MeO	н	4-CH2-CH	H
	н	4-TMS	н	н	4-CH2=C (CH3) CH2)	н
25	Н	4-1	н	н	4-CH2=CHCH2O	H
	н	4- <u>t</u> -BuO	н	н	4-MeOCH ₂ CH ₂	н
	н	4-CF ₃ (CH ₂) ₃ 0	н	н	4-MeOCH ₂ O	н
	н	4-CF ₃ (CF ₂) ₂	н			
30		5 2 2				
		R ² is B	; R ³ is H; R ⁴	is H; R ⁷	is H; R ¹⁸ is H	
	R1	R ⁵	R ⁶	R ¹	R ⁵	R ⁶
35	н	н	н	н	4-Br	н
	Н	4-NMe2	н	н	4-F	H
	н	4-Me	н	н	4-OH	н
*	н	4-Et	н	н	4-MeO	н
40	н	4-n-Pr	н	н	4-EtO	H
	н	4-1-Pr	н	н	4-CF3	H
	H	4-n-Bu	H	н	4-CF3CH2O	н
45	н	4- <u>sec</u> -Bu	н	Me	н	н
	н	4- <u>i</u> -Bu	н	Me	4-M•	H
	н	4- <u>t</u> -Bu	н	Me	4-Et	н
50	н	4-C1	н	Me	4-1-Pr .	H

		\mathbb{R}^2 is	H; R ³ is H;	R ⁴ is	H; R ⁷	is H; R1	8 is H
	R1	R ⁵	B ⁶		R1	R ⁵	R ⁶
5	Me	4-C1	н	1	Et	4- <u>1</u> -Pr	н
	Me	4-MeO	н		Et	4-C1	Ħ
	Me	4-EtO	H		Et	4-MeO	H
10	Me	4-CF3	н		Et	4-EtO	н
	Et	н	н		Et	4-CF3	H
	н	3-NMe2	н .	1	н	2-Me	н
	н	3-Ме	H		H	2-Et	H
15	н	3-Et	H		H	2-C1	н
	н	3-n-Pr	H		H	2-F	н
	н	3- <u>1</u> -Pr	н		H	2-OH	Н
20	н	3-n-Bu	н .		Me	2-Me	н
	н	3-C1	Н		Me	2-C1	н
25	н	3-Br	н		Me	2-F	H
	н	3-F	н		Et	2-Me	н
25	н	3-OH	н		Et	2-C1	н
	н	3-MeO	н		Et	2-F	H
	H	3-EtO	н		H	2-Me	4-Me
30	н	3-CF3	н		Н	2-Me	5-Me
	н	3-CF3CH2O	H	- 1	Н	3-Me	4-Me
	Me	3-Me	н		Н	2-Et	4-Et
35	Me	3-Et	н		H	2-Et	5-Et
	Me	3- <u>1</u> -Pr	н		Н	3-Et	4-Et
	Me	3-C1	н		Н	2-Me	5- <u>L</u> -Bu
	Me	3-Me0	н		н	2-C1	4-Cl
40	Me	3-EtO	н		H	2-C1	5-C1
	Me	3-CF3	H		Et	3-MeO	н
	Et	3-Me	н		Et	3-Et0	н
45	Et	3-Et	н		Et	3-CF3	H
	Et	3- <u>1</u> -Pr	Н		Me	2-Me	4-Me
	Et	3-C1	н	1	Me	2-Me	5-Me
50	Et	4-Me	н		Me	3-Me	4-Me .
	Et	4-Et	н		Me	2-Et	4-Et

		R ² i	s H; R ³ is H; R ⁴	is H; R	7 is H; R ¹⁸	is H
	R^1	R ⁵	R ⁶	R ¹	R ⁵	R6
5	Me	2-Et	5-Et	Et	2-MeO	4-Me0
	Me	3-Et	4-Et	Et	3-MeO	5-MeO
	Me	2-Me	5- <u>1</u> -Bu	Et	3-MeO	4-Me0
10	Et	2-Me	4-Me	н	3-Br	5-Br
	Et	2-Me	5-Me	Me	3-Br	5-Br
	Et	3-Me	4-Me	Et	3-Br	5-Br
	Et	2-Et	4-Et	н	3-Me	5-Me
15	Et	2-Et	5-Et	Мө	3-Me	5-Me
	Et	3-Et	4-Et .	Et	3-Me	5-Me
	H	4-Ph	н	н	3-C1	4-MeO
20	н	4-PhO	H .	Me	3-C1	4-MeO
	н	4- <u>c</u> -Hex	H .	Et	3-C1	4-MeO
25	н	4-Hex	н	Me	4-NMe ₂	н
	н	4- <u>n</u> -Amyl	Н	Me	3-NMe2	н
	Me	4-Ph	H	Et	4-NMe ₂	H
	Me	4-PhO	н	Et	3-NMe ₂	H
	Me	4-c-Hex	н	н	3-NH ₂	Н
30	Me	4-Hex	н	н	4-NH ₂	н
	Me	4- <u>n</u> -Amyl	H	Me	3-NH ₂	H
	Н	3-C1	4-C1	Me	4-NH ₂	Н
35	Me	2-C1	4-C1	Et	3-NH ₂	Н
	Me	2-C1	5-C1	Et	4-NH ₂	Н
	Me	3-C1	4-C1	n-Pr	4-NMe ₂	H
	Et	2-C1	4-C1	n-Pr	4-Me	н
40	Et	2-C1	5-C1	n-Pr	4-Et	н
	Et	3-C1	4-C1	n-Pr	4- <u>n</u> -Pr	Н
	н	2-MeO	4-MeO	n-Pr	4-C1	H
45	H	3-MeO	5-MeO	n-Pr	4-F	H
	н	3-MeO	4-MeO	n-Pr	4-Br	H
	Me	2-MeO	4-MeO	n-Pr	4-MeO	H
50	Me	3-MeO	5-MeO	n-Pr	4-EtO	H.
	Me	3-MeO	4-MeO	n-Pr	4-CF3	н

		\mathbb{R}^2 is	H; R ³ is H; R ⁴ i	в н; к ⁷	is H; R ¹⁸ is	н
	B1	₽ ⁵	R ⁶	R ¹	R ⁵	R ⁶
5	n-Pr	4-CF3CH2O	н	n-Bu	3- n -Pr	H
	n-Pr	3-NMe2	н	n-Bu	3-C1	н
	n-Pr	3-Ме	н	n-Bu	3- F	H
10	n-Pr	3-Et	н	n-Bu	3-MeO	H
	n-Pr	3- n -Pr	н .	n-Bu	3-EtO	Ħ
	n-Pr	3-C1	н	<u>n</u> -Bu	3-CF3	, H
	n-Pr	3-F	н	n-Bu	3-CF3CH2O	H
15	n-Pr	3-Br	н	<u>1</u> -P=	H	H
	n-Pr	3-MeO	н	i-Pr	4-Me	H
	n-Pr	3-EtO	н	i-Pr	4-Et	H
20	n-Pr	3-CF3	н	<u>i</u> -Pr	4- <u>n</u> -Pr	H
	n-Pr	3-CF3CH2O	н	<u>i</u> -Pr	4- <u>1</u> -Pr	H
25	n-Pr	3-Me	4-Me	<u>i-Pr</u>	4-Cl	H
	n-Pr	3-Me	5-Me	<u>i-Pr</u>	4-F	H
	n-Pr	3-C1	4-C1	<u>i</u> -Pr	4-Br	н
	n-Pr	3-MeO	4-MeO	i-Pr	4-Me0	Н
	n-Pr	3-MeO	5-MeO	<u>i</u> -Pr	4-EtO	н
30	n-Pr	н	н	<u>i</u> -Pr	4-CF ₃	н
	n-Bu	н	н	<u>i</u> -Pr	4-CF3CH2O	H
	n-Bu	4-Me	н	<u>i</u> -Pr	3-Me	4-Me
35	n~Bu	4-Et	н	<u>i-Pr</u>	3-Me	5-Me
	n-Bu	4-n-Pr	н	1-Pr	3-C1	4-C1
	n-Bu	4- <u>i</u> -Pr	н	<u>i</u> -Pr	3-MeO	4-MeO
40	n-Bu	4-C1	н	<u>i-Pr</u>	3-MeO	5-MeO
40	n-Bu	4-F	н	H	4-TMS	H
	n-Bu	4-Br	H	H	4-I	н
	<u>n</u> −Bu	4-Me0	н	H	4- <u>t</u> -BuO	H
45	n-Bu	4-EtO	н	H	4-CF3 (CH2) 30	Н
	n-Bu	4-CF3	н	н	4-CF ₃ (CF ₂) ₂	н
	n-Bu	4-CF3CH2O	н	н	4-(CF ₃) ₂ CH	H
50	n-Bu	3-Me	н	Н	4-CH ₃ CHC1CH	H
	n-Bu _	3-Et .	н	Me	4-TMS	н

R^2 is H; R^3 is H; R^4 is H; R^7 is H; R^{18} is H									
	\mathbf{R}^{1}	R ⁵		R ⁶	R1	R ⁵		R ⁶	
5	Me	4-I		н .	н	4-MeS (0)2	H	
	Me	4- <u>t</u> -Bu	0	R	н	4-CH ₂ -	CH	H	
	Me	4-CF3 (CH ₂) 30	Н	н	4-CH ₂ -	C(CH ₃)CH ₂)	H	
10	н	4-MeS		н	н	4-CH2-	сиси ₂ 0	H	
,,	н	4-EtS		Ĥ	н	4-MeOC	4-MeOCH2CH2		
	H	4-MeS (0)	Н	н	4-MeOC	H ₂ O	H	
	н	4- <u>1</u> -Pr	s (0)	н					
15									
				H; R ⁴ is F	1				
	R1	R ²	R ⁵	R ⁶	R1	R ²	R ⁵	R ⁶	
20	Me	4-Me	H	·H	Me	4-Et	4-Et	H	
	Me	4-Me	4-Me	н	Me	4-Et	4- <u>1</u> -Pr	H	
	Me	4-Me	4-Cl	н	Me	4-Et	3-Me	H	
25	Me	4-Me	4-MeO	Н	Me	4-Et	3-C1	H	
25	Me	4-Me	4-EtO	H	Me	4-Et	3-MeO	H	
	ме	4-Me	4-Et	Н	Me	4-Et	3-EtO	H	
	Me	4-Me	4-1-Pr	H	Me	4-Et	3-Et	H	
30	Me	4-Me	3-Me	н	Me	4-Et	3-1-Pr	H	
	Me	4-Me	3-C1	H	Et	4-Et	H	H	
	Me	4-Me	3-MeO	н	Et	4-Et	4-Me	Н	
35	Me	4-Me	3-EtO	Н	Et	4-Et	4-Cl	H	
	Me	4-Me	3-Et	H	Et	4-Et	4-Me0	H	
	Me	4-Me	3- <u>1</u> -Pr	Н	Et	4-Et	4-EtO	H	
	Me	4-Et	H	Н	Et	4-Et	4-Et	Н	
40	Me	4-Et	4-Me	н	Et	4-Et	4- <u>i</u> -Pr	Н	
	Me	4-Et	4-Cl	н	Me	4-Me	3-Me	4-Me	
	Me	4-Et	4-MeO	н	Me	4-Me	3-Me	5-Me	
45	Me	4-Et	4-EtO	н	Me	4-Me	3-C1	4-C1	

50

			R ³ is H	; R ⁴ is H;	R ⁷ is	H; R ¹⁸ j	ls H	
	B1	R ²	R ⁵	R ⁶	Rl	R ²	. B ⁵	R6
5	Me	4-Me	3-C1	5-C1	H	6-он	4-Me	H
	Me	4-Me	3-MeO	4-MeO	H	6-OMe	3-Me	H
	Me	4-Me	3-MeO	5-MeO	H	6-OMe	3-Me	4-Me
10	H	6-ОН	н	н	H	6-OEt	4-Cl	H
	н	6-OMe	H	н	H	5-CMe	4-F	H
	н	6-OEt	н	н	H	5-OMe	3-C1	H
	н	6-OC (O) Me	н	н	H	5-OMe	4-C1	H
15	н	5-OH	H	н	H	5-Br	4-C1	H
	Н	5-OMe	н	н	Me	6ОН	Н	H
	Н	5-OEt	. н	н	Me	6-OMe	H	H
20	н	5-Br	н	.н	Me	4- <u>n</u> -Pr	H	H
	Н	5-Me	н	н	Et	4- <u>n</u> -Pr	Н	H
	н	6-Me	H	н				
25								
20				; R ⁴ is H				
	R1	E ²	B ⁵	R ⁶	R1	R ²	R ⁵	Re
	Me	4-Me	Н	н	Me	4-Et	4-Me	H
30	Me	4-Me	4-Me	н	Me	4-Et	4-C1	Н
	Me	4-Me	4-Cl	н	Me	4-Et	4-MeO	H
	Me	4-Me	4-Me0	н	Me	4-Et	4-EtO	H
35	Me	4-Me	4-EtO	Н	Me	4-Et	4-Et	H
	Me	4-Me	4-Et	н	Me	4-Et	4- <u>i</u> -Pr	H
	Me	4-Me	4- <u>1</u> -Pr	н	Me	4-Et	3-Ме	Н
	Me	4-Me	3-Me	н	Me	4-Et	3-C1	H
40	Me	4-Me	3-C1	н	Me	4-Et	3-MeO	H
	Me	4-Me	3-MeO	н	Me	4-Et	3-Eto	H
	Me	4-Me	3-Et0	н	Me	4-Et	3-Et	Н
45	Me	4-Me	3-Et	н	Me	4-Et	3- <u>1</u> -Pr	H
	Me	4-Me	3- <u>1</u> -Pr	н	Et	4-Et	Н	H
	Me	4-Et	Н	н	Et	4-Et	4-Me	H

			R ³ is 1	1e; R ⁴ 1s H;	R ⁷ 3	.в н; R ¹⁸	is H	
	R ¹	R ²	R ⁵	R6	R1	R ²	R ⁵	\mathbb{R}^6
	Et	4-Et	4-C1	н	н	5-OEt	Ħ	H
5	Et	4-Et	4-MeO	н	н	5-Br	H	H
	Et	4-Et	4-EtO	н	H	5 -Mo	H	H
	Et	4-Et	4-Et	н	H	6-Me	H	H
10	Et	4-Et	4- <u>1</u> -Pr	R	H	6-0H	4-Me	H
	Me	4-Me	3-Me	4-Me	н	6-OMe	3-Me	H
	Me	4-Me	3-Me	5-Me	H	6-OMe	3 -Ma	4-Me
15	Me	4-Me	3-Cl	4-C1	H	6-OEt	4-Cl	H
,	Me	4-Me	3-C1	5-C1	H	5-OMe	4-F	H
	Me	4-Me	3-MeO	4-MeO	H	5-OMe	3-C1	H
20	Me	4-Me	3-MeO	5-MeO	H	5-OMe	4-C1	Н
	H	6-он	H	н	H	5-Br	4-C1	H
	н	6-OMe	H	н	Me	6-OH	н	H
25	H	6-OEt	H	Н	Me	6-OMe	H	H
	н	6-0C(0)Me	H	н	Me	4- <u>n</u> -Pr	H	Н
	н	5-OH	H	н	Et	4-n-Pr	н	H
	н	5-OMe	H	н				
30			53 te M	e; R ⁴ is Me	. _R 7	is H. R18	is H	
	R1	R ²	B ⁵	R6	R1	R ²	R5	R6
	В- Me	4-Me	Н	н	Me	4-Me	3-Et0	н
35	Me	4-Me	4-Me	н	Me	4-Me	3-Et	н
	Me	4-Me	4-C1	н	Me	4-Me	3-1-Pr	н
	Me	4-Me	4-MeQ	н	Me	4-Et	н	н
	Me	4-Me	4-EtO	н	Me	4-Et	4-Me	н
40	Me	4-Me	4-Et	R	Me	4-Et	4-C1	H
	Me	4-Me	4- <u>i</u> -Pr	н	Me	4-Et	4-Me0	H
	Me	4-Me	3-Me	н	Me	4-Et	4-EtO	H
45	Me	4-Me	3-C1	н	Me	4-Et	4-Et	н
	Me	4-Me	3-MeO	н	Me	4-Et	4- <u>1</u> -Pr	н

			R ³ is h	de; R ⁴ is Me	; R ⁷	is H; R ¹⁸	is H	
	R1	B ²	R ⁵	B6	B1	R ²	R ⁵	R ⁶
5	Me	4-Et	3-Me	н	н	6-OEt	H	H
	Me	4-Et	3-C1	н	н	6-0C(O)Me	H	н
	Me	4-Et	3-MeO	н	H	5-OH	H	Н
	Me	4-Et	3-Et0	н	H	5-OMe	H	H
10	Me	4-Et	3-Et	н	H	5-OEt	H	H
	Me	4-Et	3-1-Pr	H,	H	5-Br	H	H
	Et	4-Et	н	н	H	5-Me	H	H
15	Et	4-Et	4-Me	н	H	6-Ме	H	Н
	Et	4-Et	4-C1	н	H	6-он	4-Me	Н
	Et	4-Et	4-MeO	н	H	6-OMe	3-Me	H
20	Et	4-Et	4-EtO	н.	H	6-OMe	3-Me	4-Me
	Et	4-Et	4-Et	Я	H	6-OEt	4-Cl	H
	Et	4-Et	4- <u>i</u> -Pr	н	H	5-OMe	4-F	Н
	Me	4-Me	3-Me	4-Me	H	5-OMe	3-C1	Н
25	Me	4-Me	3-Me	5-Me	H	5-OMe	4-C1	Н
	Me	4-Me	3-C1	4-C1	H	5-Br	4-C1	H
	ме	4-Me	3-C1	5-C1	Me	6-OH	Н	н
30	Me	4-Me	3-MeO	4-Me0	Me	6-OMe	H	H
	Me	4-Me	3-MeO	5-MeO	Me	4-n-Pr	H	Н
	H	6-OH	н	н	Et	4- <u>n</u> -Pr	н	Н
35	н	6-OMe	Н	н				
•								
	R^2 i	s H; R ³ i	s Me; R ⁴	is Me;		is H; R ³ i	s Me; R4	is H;
	R18	is H				is H	_	_
40	R ¹	R ⁵	B6	B ⁷	R1	R ⁵	R ⁶	R7
	н	3-Me	4-Me	5-Me	Me	3-Me	4-Me	5-Me
	H	3-Br	4-Me	5-Br	Me	3-Br	4-Me	5-Br
45	H	3-C1	4-MeO	5-C1	Me	3-C1	4-MeO	5-C1
	н	3-MeO	4-MeO	5-MeO	Me	3-MeO	4-MeO	5-MeO

	\mathbb{R}^2 is H; \mathbb{R}^3 is Me; \mathbb{R}^4 is Me;					R^2 is H; R^3 is Me; R^4 is H;				
5	R ¹⁸ i	з Н			R ¹⁸ 1	s H		_		
ū	R1	B ⁵	R ⁶	R ⁷	R1	R ⁵	R6	B7		
	H	4-TMS	H	н	Me	3-Me	4-Me	5 -Me		
	Me	4-TMS	н	н	Me	3-Br	4-Mo	5-Br		
10	Et	4-TMS	н	H.	Me	3-C1	4-Me	5-C1		
	Et	3-Me	4-Me	5-Me	Me	3-MeO	4-MeO	5-MeO		
	Et	3-MeO	4-MeO	5-MeO	н	4-TMS	н	H		
15	н	2-C1	5-Br	н	Me	4-TMS	H	Н		
	Me	2-C1	5-Br	Н	Et	4-TMS	H	н		
	н	3-Me	4-Me	5-Me	Et	3-Me	4-Me	5-Me		
	н	3-Br	4-Me	5-Br	Et	3-Me	4-MeO	5-MeO		
20	н	3-C1	4-MeO	5-C1	H	2-C1	5-Br	н		
	н	3-MeO	4-MeO	5-MeO	Me	2-C1	5-Br	Н		
25	R ⁴ is	Me; R ⁶ , F	2, R ¹⁸ a	ind R ⁷	\mathbb{R}^2 , \mathbb{R}	18, R ¹ ,	R ⁶ and	R ⁷		
	are H				are H					
	B1	R ³	R ⁵		R ³	R ⁴	B	5		
30	Me	MeC=C	4-Me		<u>i</u> -Pr	MeO	4	-MeO		
•	Me	Me C=C	4-CF3C	н ₂ о	Et	c-Pr	н			
	Me	Cl	3-CF3		Et	MeC≕C	3	-F		
	Me	CF2C1	4-Me0		Et	CH ₂ F	4	-C1		
35	<u>i</u> -Pr	CF3	H		Et	CF3CH2	0 - 4	-Me		
	<u>1</u> -Pr	sec-Bu	2-F		Et	i-Pr	4	-CF3CH2O		
	1-Pr	CF3	3-C1		Et	n-Bu	3-	-CF3		
40	<u>i</u> -Pr	CF ₃	3-Me		Et	HC=CCH	20 4	-MeO		
	<u>i</u> -Pr	CF ₃	4-CF3C	н ₂ 0	<u>t</u> -Bu	Br	4-	-C1		
	i-Pr	Et	3-CF ₃		Ph	CF3 (CF	2)3 4	-Me		

	R ⁴ is Me	e; R ⁶ , R ² , I	_R 18	and R ⁷	R^2 , R^{18} , R^1 , R^6 and R^7			
	are H				are H			
5	R1	R ³	,	₈ 5	R3	R ⁴	R ⁵	
	Bzl	4-aec-BuS		4-CF3CH2O	Cl	Cl	н	
	н	NH ₂		4-Me	Cl	CI	2-F	
10	4-g-Pr	сн ₃ осн ₂		4-Me	Cl	CI	3-C1	
10	4- <u>c</u> -Pr	CF3CH2O		4-CF3CH2O	Cl	C1	4-Me	
	4- <u>c</u> -Pr	MeS		4-CF3	сн3с∞с	CI	4-CF3CH20	
	4-c-Pr	CH2=C(Et)		4-MeO	CH3C=C	F	3-cr ₃	
15	4-c-Pr	CH2=CHCH2		н	CH3C≖C	сн ₃ осн ₂	4-MeO	
	4-g-Pr	±-BuO.		4-F	OCF3	sec-Bu	4-C1	
	4- <u>c</u> -Pr	HCF ₂ O	:	2-C1	OCF ₃	Br	4-Me	
20	4-g-Pr	CH2=CHCH2	0	4-Me	OCF ₃	<u>1</u> -Pr	4-CF3CH2O	
	4-c-Pr	MeC=CCH2O	, ,	4-CF3CH2O	NH2	NH2	4-Me	
	4- <u>c</u> -Pr	NMe ₂	;	3-CF3	NH2	NH2	4-Cl	
	4-c-Pr	NHEt		4-MeO	NHMe	NHMe	4-MeO	
25								
	R ² is H	; R ⁴ is Me;	R ⁶ ,	, R^{18} and	$R^{18}, R^2,$	R1, R6 a	nd R ⁷ are H	
	R ⁷ are	H.						
30	R ¹	_B 3	\mathbb{R}^5		B ³	R ⁴	R ⁵	
	Me l	MeC≡C	H		c-Pr	c-Pr	н	
	Me !	MeC≡C	F		c-Pr	<u>c</u> -Pr	4-F	
35	Me 1	MeC≖C	Cl		g-Pr	<u>c</u> -Pr	4-C1	
					c-Pr	<u>c-Pr</u>	4-Me.	
					<u>c</u> -Pr	сн3сес	4-CF3CH2O	
					c-Pr	сн3сжс	3-CF3	
40					g-Pr	сн ₃ с⊯с	3-MeO	
					<u>c</u> -Pr	CF3	н	
					C-br	CF3	2- F	
45					g-Pr	CF ₃	3-C1	

TABLE 6

R³ 5 R⁴
N N N
R² 6 N N
R² 6 N N
R² 1 E

 R^1 , R^2 , and R^3 are H; R^4 is Me

E

5

10

15

20

30

1-naphthalenyl

2-furanyl 25 2-naphthalenyl

3-thienyl

2,5-dimethyl-3-furanyl

2,5-dimethyl-3-thienyl

4-methylphenoxy

2-chlorophenoxy

2,6-dimethylphenoxy

3-methylphenylthio

phenylamino

benzyl

40 Et

sec-Bu

g-propyl

45 cis-2-methylcycloheptyl

sec-butylthio

CF3CH2O

5-methyl-2-thienyl

5-methyl-2-pyridyl

 R^1 and R^2 are H; R^3 is 4-Me; R^4 is Me

E

1-naphthalenyl

2-furanyl

2-naphthalenyl

3-thienyl

2,5-dimethyl-3-furanyl

2,5-dimethyl-3-thienyl

4-methylphenoxy

2-chlorophenoxy

2,6-dimethylphenoxy

4-cyanophenylthio

4-methylphenylamino

Ç1

n-hex

Me

c-hexyl

 $\mathtt{CF_3CH_2CH_2}$

n-butoxy

C1 (CH2) 50

4-methyl-3-furanyl

2-methyl-3-pyridyl

55

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R^1 and R^2 are H; R^3 is 4-Me;
          R^1, R^2 and R^3 are H; R^4 is Me
                                                                 R4 is Me
        E
                                                 4-chloro-3-pyridyl
        4-pyridyl
                                                 2-indanyl
        2-indanyl
                                                 2-tetrahydronaphthalenyl
10
        2-tetrahydronaphthalenyl
                                                 6-Me-3-pyridyl
        6-Me-3-pyridyl
                                                 2-pyridyl
        2-pyridyl
15
                                                      R^1 and R^4 are Me; R^3 is 4-Me;
             R^1, R^2, R^3 and R^4 are H
                                                                  \mathbb{R}^2 is H
        E
                                                 1-naphthalenyl
20
        1-naphthalenyl
                                                 2-furanyl
        2-furanyl
                                                 3-thienyl
        3-thienyl
                                                 3-pyridyl
        3-pyridyl
                                                           R^3 is 4-Me; R^4 is Me
               R^3 is 4-Me; R^4 is Me
                                                 R1
                                                        \mathbb{R}^2
                                                                       E
                \mathbb{R}^2
                            E
        \mathbb{R}^1
                                                        5-Et
                                                                       Ph
                                                 н
30
                            Ph
        H
                5-Me
                                                        5-<u>sec</u>-Bu
                                                                       2-Me-Ph
                            2-Me-Ph
                5-1-Pr
        H
                                                                       2-C1-Ph
                                                        5-CF3 (CF2)3
                5-n-Bu
                            2-Cl-Ph
                                                                       2-MeO-Ph
                                                        5-<u>t</u>-Bu
                            2-MeO-Ph
                5-CN
35
                                                                       2-CF3CH2O-Ph
                            CF3CH20-Ph
                                                        5-FCH<sub>2</sub>
                5-CF3
        Н
                                                 H
                                                        6-n-Pr
                                                                       1-naphthalenyl
                            1-naphthalenyl
                6-CF3CH2
                                                                       Ph
                                                        4-Me
                                                 Me
                5-Me
        i-Pr
                                                                       2-Me-Ph
                                                        4-Me
                            2-Me-Ph
                                                 Mo
        i-Pr
                5-Me
```

73

45

	R ³ is 4-1	e; R ⁴ is Me	
	R1	R ²	E
5	<u>i</u> -Pr	5-Me	2-C1-Ph
_	<u>i</u> -Pr	5-Me	2-MeO-Ph
	i-Pr	6-Me	2-CF3CH2O-Ph
	cı	Н	Ph
10	F	H	4-Me-Ph
	CF3CF2	н	4-Cl-Ph
	CH2=CHCH2	н	4-MeO-Ph
15			
	R ³ is 4	-Me; R ⁴ is Me	
	R ¹	R ²	E
••	CO ₂ Me	н	2-CF3CH2O-Ph
20	2-Me-Ph	н	Me
	Bzl	н	Ph
	2-naphthalenyl	н	n-Bu
25	3-thienyl	H	CF3CF2
	3-pyridyl	H	Me
	CM	5-Me	, Ph
30	<u>t</u> -Bu	5-Me	2-Me-Ph
	C1CH ₂	5-Me	2-C1-Ph
•	Et	5-Me	2-MeO-Ph
	n-Pr	5-Me	2-CF3CH2O-Ph
35	Me	4-Me	2-CF3-Ph
	i-Pr	4-Me	2-CF3-Ph
	CF ₃	4-CF3	2-CF3-Ph

	R ³ is	4-Me; R ⁴ is M	e.
	B1	R ²	E .
5	Me	4-Me	2-TMS-Ph
	Ме	4-Me	2-Cl-Ph
	Ме	4-Me	2-MeO-Ph
-	Me	4-Me .	2-CF3CH2O-Ph
10	Br	н	Ph
	CN	н	4-Me-Ph
	Ac	н	4-C1-Ph
15	сн ₃ с=ссн ₂	H	4-MeO-Ph
•	•		
		4-Me; R ⁴ is M	
20	B ¹	B ²	E ,
	CO ₂ Et	Н	2-CF3CH2O-Ph
	4-C1-Ph	H	Ph
	5-Me-3-furyl	H	<u>i-Pr</u>
25	EtCO	H	2-C1-Ph
	2-furyl	4-Me	CF ₃
	Ph	5-Me	Me
30	CN	4-Me	Ph
	<u>t</u> -Bu	4-Me	2-Me-Ph
	FCH ₂	4-Me	2-C1-Ph
35	Et	4-Me	2-MeO-Ph
35	C1 (CH ₂) 4	4-Me	2-CF3CH2O-Ph
	Ме	4-Me	2-CF3-Ph
	<u>i</u> -Pr	5-CN	2-CF3-Ph
40	cr ₃	5-Me	2-CF3-Ph
	<u>i</u> -Pr	4-Me	2-TMS-Ph

TABLE 7

R ³
3 ^Y N p5
$\frac{1}{1} \frac{1}{110} \frac{3}{110} R^6$
6 5 R7

20			R ⁷ is H; R ³ is H	R ⁴ is H	; Y is CH	
	R ¹	B ⁵	R ⁶	B1	R ⁵	R6
	Н	н	н	н	н	4-F
25	н	F	н	н	F	4-F
	н	Cl	н	H	CJ.	4-F
	H	Me '	н	H	Me	4-F
30	н	CF3CH2O	н	H	CF3CH2O	4-F
30	н	CF3	н	H	CF3	4-F
	н	MeO	н	H	MeO	4-F
	н	Н	4-C1	Me	Н	H
35	Me	F	5-F	Me	F	н
	Me	Cl	5-C1	Me	Cl	H
	Me	Me	4-F	Me	Me	н
40	Me	CF3CH2O	4-F	Ме	CF ₃ CH ₂ O	н
	Me	CF ₃	4-F	Me	CF ₃	H
	ме	MeO	4-F	Me	MeO	H
40	н	H	3-CF ₃	Et	H	H
45	н .	F	6-F	Et	F	н
	H	Cl	6-C1	Et	Cl	H

R^7 is H; R^3 is H; R^4 is H; Y is CH						
	B1	R ⁵	R6	B1	R ⁵	B 6
5	н	Me	6-Me	Et	Me	H
3	н	ст ₃ сн ₂ о	6-Me	Et	CF3CH2O	н
	н	CIF3	6-M o	Et	CF3	H
	н	MeO	6-MeO	Et	MeO	H
10	H	H	4-Br	1-Pr	H	Ħ
	Me	F	6- r	i-Pr	F	H
	Me	Cl	6-C1	i-Pr	Cl	н
15	Me	Me	6-Me	i-Pr	Me	H
	n-Pr	CF3CH2O	н	i-Pr	CF3CH2O	н
	± −Bu	CF3	H .	1-Pr	CF3	н
	sec-Bu	MeO	н .	i-Pr	MeO	H
20	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF ₂ O
	н	Br	н	н	I	н
	H	<u>t</u> -BuO	Н	н	EtO	H
25						
			7 is H; R^3 is H	l; R ⁴ is M	le; Y is Ch	ì
	B1 '	B ⁵	R ⁶	R ¹	R ⁵	R ⁶
30	H	H	Н	н	H	4-F
	H	F	н	н	F	4-F
·	н	Cl	н	н	Cl	4-F
	H	Me	H	H	Me	4-F
35	H	CF3CH2O	H	н	CF3CH2O	4-F
	н	CF3	H	н	CF ₃	4-F
	н	MeO	н	н	MeO	4-F
40	H	H	4-Cl	Me	н	Н
	Me	F	5-F	Me	F	н
	Me	Cl	5-C1	Ме	Cl	н
45	Ме	Me	4-F	Me	Me	н
45	Me	CF3CH2O	4-F	Me	CF3CH2O	н
	Me	cr ₃	4-F	Me	CF3	н

		R	is H; R ³ is H;	R ⁴ is Me	; Y is CH	
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R ₆
5	Me	MeO	4-F	Me	MeO	H
	н	н	3-cr ₃	Et	H	H
	н	F	6-F	Et	F	H
10	H	Cl	6-C1	Et	C1	H
	H	Me	6-Me	Et	Me	H
	н	CF3CH2O	6-Ме	Et	CF3CH2O	В
	H	CF3	6-Me	Et	CF ₃	н
15	н	MeO	6-MeO	Et	MeO	H
	н	н	4-Br	<u>i-Pr</u>	H	H
	Me	F	6-F	i-Pr	F .	H
20	Me	Cl	6-C1	i-Pr	Cl	н
	Me	Me	6-Me	<u>i</u> -Pr	Me	н
	n-Pr	CF3CH2O	н	i-Pr	CF3CH2O	H
25	±−Bu	CF3	н	i-Pr	CF3	н
20	sec-Bu	MeO	н	1-Pr	MeO	н
	H	HCF20	н	н	HCF20	6-HCF ₂ O
	н	Br	н	Me	I	H
30	н	<u>t</u> BuO	н	Me	EtO	Н
		_R 7	is H; R ³ is 4-M			
35	R1	R ⁵	R ⁶	R1	R ⁵	R ⁶
	н	н	н	н	H	4-F
	н	F	н	н	F	4-F
	н	Cl	н	H	Cl	4-F
40	н	Me	H	Ħ	Me	4-F
	н	CF3CH2O	H	Н	CF ₃ CH ₂ O	4-F
	н	CF3	н	н	CF3	4-F
45	н	MeO	н	H	MeO	4~F
	н	н	4-C1	Me	H	H
	Me	F	5-F	Me	F	н
50	Me	Cl	5-C1	Me	CI	н -
	Me	Me	4-F	Me	Me	н

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```
R^7 is H; R^3 is 4-Me; R^4 is Me; Y is N
                                                        R1
                                                                   R<sup>5</sup>
                                                                               R<sup>6</sup>
                                   B6
                       \mathbb{R}^5
           R1
                                                                   CF3CH2O
                                                        Mo
                       CF3CH2O
                                    4-F
           Me
                                                                               H
                                                                   CF3
                                    4-F
                                                        Мe
                       cr_3
           ме
                                                                               H
                                    4-F
                                                        Me
                                                                   MeO
                       MeO
           Me
                                                                               Н
                                                        Et
                                    3-CF3
                       H
10
                                                                               H
                                                        Et
                                    6-F
                       F
           H
                                                        Σt
                                    6-C1
           H
                       Cl
                                                        Et
                                                                   Me
                                                                               H
                                    6-Me
                       Me
15
                                                        Et
                                                                   CF3CH2O
                       CF3CH20
                                    6-Me
           Н
                                                                   CF3
                                    6-Me
                                                        Et
                       CF3
           H
                                                        £t
                                                                   MeO
                                                                               H
                                    6-MeO
                       MeO
           н
                                                                   н
20
                                                        i-Pr
                       Н
                                    4-Br
           н
                                                                               н
                                                        i-Pr
                                    6-F
                       F
                                                        i-Pr
                                                                   Cl
                                    6-C1
                       Cl
           ме
                                    6-Me
                                                        i-Pr
                                                                   Me
                       Me
           ме
25
                                                        <u>i-Pr</u>
                                                                   CF3CH2O
                       CF3CH2O
           n-Pr
                                                                   CF3
                                                        i-Pr
           <u>‡</u>~Bu
                       CF3
                                    H
                                                                               н
                                                        <u>i-Pr</u>
                                                                   MeO
                                   н
                       MeO
           sec-Bu
                                                                               6-HCF20
                                                        Н
                                                                   HCF20
                       HCF20
                                   Н
           Н
                                                                   1
                                                                               н
                                                        H
                                    н
                       Br
           H
                                                        H
                                                                   EtO
                                                                               H
                       <u>t</u>-BuO
           H
 35
               \mathbb{R}^4 is Me; \mathbb{R}^6 and \mathbb{R}^7 are H
                                                          R^1, R^6, and R^7 are H; Y is N
                           Y is CH
                                                                               R5
                                                        \mathbf{R}^3
                                                                   R4
                       \mathbb{R}^3
                                   R<sup>5</sup>
           \mathbb{R}^{1}
 40
                                                                               H
                                                        4-g-Pr g-Pr
                       4-<u>c</u>-Pr
                                   H
           H
           н
                       4-g-Pr
                                   F
                                                        4-c-Pr c-Pr
                       4-g-Pr
                                   Cl
           H
                                                        4-g-Pr g-Pr
                                                                               Me
                       4-g-Pr
                                   Me
           н
                                                                  CH<sub>3</sub>C=C
                                                                               CF3CH2O
                                   CF3CH2O
           H
                       4-g-Pr
                                                        4-g-Pr
                                                                  CH3C∞C
                                                                               CF3
                                   CF3
           н
                       4-g-Pr
                                                                               MeO.
                                                        4-g-Pr CH3C=C
                       4-c-Pr
                                   MeO
           Н
 50
```

	R ⁴ i	5 Me; R ⁶ and	R ⁷ are H	R^1 , R^6 ,	and R ⁷ are	H; Y is N
		Y is CH	1			_
5	B1	B ³	R ⁵	R ³	R ⁴	R ⁵
	Me	4-MeCmC	н	4-g-Pr	CF ₃	H
	Me	4-MeC=C	F	4-g-PI	CF3	F
10	Me	4-MeC≡C	cı	4-g-Pr	CF ₃	Cl
	Me	4-MeC=C	Me	4-g-Pr	сн ₃ осн ₂	Me
	Me	4-MeC=C	CF3CH2O	4- <u>c</u> -Pr	CF3CH2O	CF3CH2O
	Me	5-C1	CF3	4- <u>c</u> -Pr	MeS	CF ₃
15	Me	4-CF ₂ Cl	MeO	4-g-Pr	CH2=C(Et)	MeO
	1-Pr	5-CF3	н .	4-c-Pr	CH_2 = $CHCH_2$	H
	i-Pr	4-sec-Bu	F	4-c-Pr	<u>t</u> -BuO	F
20	i-Pr	4-CF3	CI	4-c-Pr	HCF20	Cl
	i-Pr	4-CF3	Me	4- <u>c</u> -Pr	сн ₂ -снсн ₂ о	Me
	i-Pr	4-CF3	CF3CH2O	4-c-Pr	MeC≡CCH ₂ O	CF3CH2O
	i-Pr	5-Et	CF3	4-c-Pr	NMe ₂	CF ₃
25	i-Pr	4-MeO	MeO	4-c-Pr	NHEt	MeO
	Et	4- <u>c</u> -Pr	н	4-C1	Cl	н
	Et	3-MeC=C	F	4-C1	Cl	F
30	Et	4-CH ₂ F	Cl	4-C1	Cl	Cl
	Et	4-CF3CH2O	Ме	4-Cl	Cl	Me
	Et	4-1-Pr	CF3CH2O	4-CH ₃ C=C	Cl	CF3CH2O
35	Et	4- <u>n</u> -Bu	CF3	4-CH3C=C	F	CF ₃
•	Et	4-HC#CCH ₂ O	MeO	4-CH3C=C	сн ₃ осн ₂	MeO
	1 −Bu	3-Br	Cl	4-0CF3	sec-Bu	Cl
	Ph	4-CF3 (CF2) 3	Me	4-OCF3	Br	Me
40	Bzl	4-sec-BuS	CF3CH2O	4-0CF3	1-Pr	CF3CH2O

TABLE 8

10 R^1 and R^2 are H; R^3 is 4-Me; R1, R2 and R3 are H; R4 is Me: Y is N R4 is Me; Y is CH 20 E 1-naphthalenyl 1-naphthalenyl 2-furanyl 2-furanyl 25 2-naphthalenyl 2-naphthaleny1 3-thienyl 3-thienyl 2,5-dimethyl-3-furanyl 2,5-dimethyl-3-furanyl 2,5-dimethyl-3-thienyl 2,5-dimethyl-3-thienyl 30 4-methylphenoxy 4-methylphenoxy 2-chlorophenoxy 2-chlorophenoxy 2,6-dimethylphenoxy 2,6-dimethylphenoxy 35 4-cyanophenylthio 3-methylphenylthio 4-methylphenylamino phenylamino benzyl 40 n-hex Et Me sec-Bu c-hexyl c-propyl cis-2-methylcycloheptyl $\mathtt{CF_3CH_2CH_2}$ n-BuO sec-butylthio C1 (CH₂) 50 CF3CH2O 4-methyl-3-furanyl 5-methyl-2-thienyl 50 2-methyl-3-pyridyl 5-methyl-2-pyridyl

	R^1 , R^2 , R^3 and R^4 are H;	R^1 and R^2 are H; R^3 is 4-Me;
	Y is CH	R ⁴ is Me; Y is N
5	E	E
	4-pyridyl	4-chloro-3-pyridyl
	2-indanyl	2-indanyl
10	2-tetrahydronaphthalenyl	2-tetrahydronaphthalenyl
	R^1 , R^2 , R^3 and R^4 are H;	R^1 and R^4 are Me; R^3 is 4-Me;
	Y is CH	R ² is H; Y is N
15	E	E
	1-naphthalenyl	1-naphthalenyl
	2-furanyl	2-furanyl
20	3-thienyl	3-thienyl
	3-pyridyl	3-pyridyl

TABLE 9

5 10			R ³	R ⁴	=\frac{3}{3} R^6	
			R ⁷ is H:	R ³ is Me;	R ⁴ is Me	
20	R ¹	R ⁵	R ⁶	R1	R ⁵	R6
	н	н	H	H	н	4-F
	H	F	Н	н	F	4-F
25	H	Cl	н	н	Cl	4-F
	н	Me	Н	н	Me	4-F
	H	CF3CH2O	H	н	CF3CH2O	4-F
30	H	cr ₃	H	н	CF ₃	4-F
30	H	MeO	н	Н	MeO	4-F
	H	н	4-C1	Me	H	н
	Me	F	5-F	Me	F	H
35	Me	Cl	5-C1	Me	C1	н
	Me	Me	4-F	Me	Me	H
	Me	CF3CH2O	4-F	Me	CF3CH2O	н
40	Me	CF ₃	4-F	Me	CF3	н
	Me	MeO	4-F	Me	MeO	н
	Н	Н	3-CF3	Et	н	н
45	H	F	6-F	Et	F	н
45	H	Cl	6-C1	Et	Cl	н
	H	Me ·	6-Me	Et	Me	н

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			R ⁷ is H; R ³	is Me; R	i is Me	
	R1	B ⁵	R6	B1	B ⁵	R ⁶
	н	CF3CH2O	6-Me	Et	CF3CH2O	H
5	н	cr ₃	6-Me	Et	cr ₃	H
	н	MeO	6-MeO	Et	MeO	н
	н	н	4-Br	i-Pr	H	Н
10	Me	F	6-r	<u>i</u> -Pr	F	H
	Me	Cl	6-C1	<u>i-Pr</u>	Cl	н
	Me	Me	6-Me	<u>i-Pr</u>	Me	н
15	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CIT3CH2O	H
15	<u>t</u> -Bu	CF3	н	<u>i</u> -Pr	CF ₃	н
	sec-Bu	MeO	H .	<u>i-Pr</u>	MeO	H
	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF ₂ O
20	н	Br	н	H	I	H
	н	<u>t</u> -BuO	н	H	EtO	H
					_	
25			d R ⁴ are Me		H; R ³ and	
	₽ ⁵	R ⁶	R ⁷	R ⁵	R ⁶	B ⁷
	H	4-C1	5-C1	Cl	4-C1	6-C1
	н	4-F	6-sec-Bu	Cl	4-C1	6-MeO
30	H	4-Et	5-1	C1	3-Me	4-C1
	н	3-F	6-CF3CH20	Cl	3-CF3	5-CF ₃
	H	4-Me	6-CF ₃ CF ₂	CI	4-MeO	5-1-BuO
35	н	4-Br	6-n-Bu0	Cl	3-n-Bu	4-Me
	Me	4-Me	6-Me	TMS	H	Н
	Me	4-F	6-ме	TMS	H	4-F
40	Me	4- <u>t</u> -Bu	6- <u>t</u> -Bu	TMS	H	6-Me
74	Me	4-CF3	6-C1	TMS	H	6-MeO
	Me	3-Me	5-Br	TMS	H	6-C1
	Me	5- <u>i</u> -Pr	6-MeO	TMS	н	6-HCF20

	R ¹ is H; I	R ³ and R ⁴	are Me	· ·	3 and R4	are Me
	R ⁵	₿ ⁶	R ⁷	R ⁵	₽e	R ⁷
	±−Bu	6-1-Bu	н	Br	6-Br	H
5	<u>t</u> -Bu	4-1-BuO	н	NMe ₂	H	н
	<u>t</u> -Bu	н	н	CONHET	H	H
	CF3 (CH2) 30	н	н	CN	H	H
10	CF ₃ (CF ₂) ₂	н	н	4-F-Ph	H	H
	(CF ₃) ₂ CH	н	н	2-Me-Ph	H	H
	sec-BuS	H	н	NO ₂	6-Me	н
15	MeS	6-MeS	н	4-Me-PhO	н	H
,,	EtS	4-F	н	PhS	H	н
	MeS (0)	н	H	со2н	3-MeO	H
	<u>1</u> -Prs (0)	Н	н	со2н	H	Н
20	t-BuS (0) 2	Н	н	HC=C	H	н
	MeS (0) 2	н	н	MeC≡C	Н	H
	CH ₂ =CH	Н	н	MeC≡CCH ₂ O	4-F	Н
25	CH2=C (CH3) CH2	н	н	<u>t</u> -BuO	H	н
	сн ₂ =снсн ₂ о	H .	н	n-Pro	H	H
	MeOCH ₂ CH ₂	H	н	EtO	5-EtO	Н
20	MeO ₂ C	H	н	Ac	н	H
30	MeOCH ₂ O	н	н	sec-BuCO	H	H
			ļ			
	R ⁴ is Me;	R ⁶ and R	1	-	R ⁶ and R ⁷	
35	R ¹	R ³	£ ⁵	R ³	R ⁴	R ⁵
	н	c-Pr	н	g-Pr	<u>c</u> -Pr	H
	н	g-Pr	F	g-Pr	g-Pr	F
40	н	g-Pr	CI	C-br	<u>c</u> -Pr	Cl
	н	g-Pr	Me	c-Pr	C-Pr	Me
	н	g-Pr	CF3CH2O	g-Pr	сн3с≖с	CF3CH2O
	н	c-Pr	CF ₃	<u>c</u> -Pr	CH3C∞C	CF3

	R ⁴	is Me; R ⁶ and	R7 are H	R	l, R ⁶ and R ⁷	are H
5	R1	R ³	R ⁵	B ³	R ⁴	R ⁵
	н	c-Pr	MeO	g-Pr	Сн3с≖с	MeO
	Me	MeO=C	н	C-br	cr ₃	н
	Me	MeC=C	r	C-Pr	CF3	r
10	Me	MeC≔C	CI.	C-Pr	CF3	CI
	Me	MeC=C	Me	<u>c-</u> Pr	сн ₃ осн ₂	Me
	Me	MeCmC	С Г 3СН2О	c-Pr	CF3CH2O	CF3CH2O
15	Me	cı	CF3	c-Pr	MeS	CF3
	Me	CF2CI	MeO	g-Pr	CH ₂ =C (Et)	MeO
	i-Pr	CF ₃	н	C-Pr	сн ₂ -снсн ₂	H
20	1-Pr	sec-Bu	F.	c-Pr	<u>t</u> -BuO	F
	<u>i</u> -Pr	CF ₃	CI	g-Pr	HCF ₂ O	Cl
	i-Pr	CF ₃	Me	g-Pr	сн ₂ -снсн ₂ о	Me
•	<u>i</u> -Pr	CF ₃	CF3CH2O	g-Pr	MeC≡CCH ₂ O	CF3CH2O
25	<u>i</u> -Pr	Et	CF ₃	c-Pr	NMe ₂	CF3
	<u>i</u> -Pr	MeO	MeO	c-Pr	NHEt	MeO
	Et	c-Pr	н	CI	Cl	H
30	Et	MeC≡C	F	Cl	C1	F
	Et	CH ₂ F	CI CI	Cl	Cl	Cl
	Et	CF3CH2O	Ме	Cl	C1	Me
35	Et	i-Pr	CF3CH2O	CH3C≡C	CI	CF3CH2O
33	Et	n-Bu	CF3	CH3C≡C	F	CF3
	Et	HC≡CCH ₂ O	MeO	сн3с=с	сн ₃ осн ₂	MeO
	<u>t</u> -Bu	Br	Cl	ocr ₃	sec-Bu	Cl
40	Ph	CF3 (CF2) 3	Me	OCF ₃	Br	Me
	Bzl	sec-BuS	CF3CH2O	ocr3	i-Pr	CF ₃ CH ₂ O

TABLE 10

5	R ³
10	n n
10	N R ⁵
15	R^1 $\frac{3}{6}$ R^6
	5 R ⁷

20			R ⁷ is H; 1	R ³ is Me; F	4 is Me	
	R ¹	B ⁵	Re.	R ¹	R ⁵	B 6
	н	н	н	я	H	4-F
25	н	F	Н	н	F	4-F
23	н	Cl	н	н	Cl	4-F
	н	Me	H	н	Me	4-F
	H	CF3CH2O	н	н	сг ₃ сн ₂ о	4-F
30	H	CF ₃	н	н	CF ₃	4-F
	н	MeO	н	Н	MeO	4-F
	H	H	4-C1	Me	H	н
35	Me	F	5- r	Me	F	H
	Me	Cl	5-C1	Me	CI	н
	Me	Me	4-F	Me	Me	H
	Me	CF3CH2O	4-F	Me	CF3CH2O	H
40	Me	CF3	4-F	Me	CF ₃	н
	Me	MeO	4-F	Me	MeO	H
	H	н	3-CF3	Et	н	Н
45	H	F	6-F	Et	F	н
	н	Cl	6-C1	Et	Cl	н
	н	Me	6-Me	Et '	Me	. н

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			R ⁷ is H; R ²	is Me; R	is Me	
	R ¹	R ⁵	R ⁶	R1	R ⁵	Re
5	н	CF3CH20	6-Me	Et	CF3CH2O	н
	н	CIF3	6-Me	Et	CF ₃	H
	H	MeO	6-MeO	Et	MeO	Н
	н	н	4-Br	1-Pr	H	H
10	Me	r	6-F	1-Pr	F	H
	Me	cı	6-C1	1-Pr	Cl	H
	Me	Me	6-Me	i-Pr	Me	н
15	n-Pr	CF3CH2O	н	i-Pr	CF3CH2O	н
	<u>t-Bu</u>	CF3	н	i-Pr	CF ₃	н
	sec-Bu	MeO	H	i-Pr	MeO	H
20	н	HCF20	н .	н	HCF ₂ O	6-HCF ₂ O
	н	Br	н	н	I	н
	н	±-BuO	Н	н	EtO	H
25			R ⁷ is H; R			
	R1	R ⁵	R ⁶	R ¹	B ⁵	R6
	Н	H	н	н	H	4-F
30	н	F	н	H	F	4-F
	H	CI	н	н	Cl	4-F
	H	Me	н	н	Me	4-F
35	H	CF3CH2O	Н	н	CF3CH2O	4-F
-	H	CF3	н	н	CF3	4-F
	H	MeO	H	Н	MeO	4-F
	H	н	4-C1	Me	H	H
40	Me	F	5-F	Me	F	H
	Me	Cl	5-C1	Me	Cl	H
	Me	Me	4-F	Me	Me	H
45	Me	CF3CH2O	4-F	Me	CF3CH2O	H
	Me	CF3	4-F	Me	CF3	н
	Me	MeO	4-F	Me	MeO	н

			R ⁷ is H; R ³	is Me; R	4 is H	
	R ¹	B ⁵	R ⁶	B1	B ⁵	R ⁶
5	н	н	3-CF3	Et	H	H
	H	F	6- F	Et	F	н .
	н	Cl	6-C1	Et	Cl	H
	н	Мо	6-Me	Et	Me	H
10	н	CF3CH2O	6-Me	Et	CF3CH20	H
	н	CF ₃	6-Me	Et	CF ₃	H
	н	MeO	6-MeO	Et	MeO	H
15	н	н	4-Br	<u>1</u> -Pr	н	н
	Me	F	6-F	1-Pr	r	H
	Me	Cl	6-C1	<u>i</u> -Pr	Cl	H
20	Me	Me	6-Me.	<u>i</u> -Pr	Ме	н
20	n-Pr	CF3CH2O	н	1-Pr	CF ₃ CH ₂ O	н
	<u>t</u> -Bu	cr ₃	н	<u>i</u> -Pr	CF ₃	H
	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	H
25	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF2O
	н	Br .	н	н	I	H
	Н	<u>t</u> -BuO	н	н	EtO	H
30				÷		
	R ⁴ i	s Me; R ⁶ ar	nd R ⁷ are H		, R^6 and R^6	are H
	B1	B ³	R ⁵	R ³	R4	R ⁵
	н	c-Pr	н	g-Pr	<u>c</u> -Pr	н
35	н	g-Pr	F	g-Pr	c-Pr	F
	н	c-Pr	C1	<u>c</u> -Pr	g-Pr	Cl
	н	<u>c</u> -Pr	Me	c-Pr	C-br	Me
40	н	g-Pr	CF3CH2O	g-Pr	сн3с≖с	CF3CH2O
	Н	C-Pr	CF ₃	c-Pr	сн₃с≖с	CF ₃

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	R^4 is Me; R^6 and R^7 are H			R^1 , R^6 and R^7 are H			
	B ¹	R ³	R ⁵	R ³	R ⁴	B ⁵	
5	H	g-Pr	MeO	g-Pr	сн3с≖с	MeO	
J	Me	MeC=C	н	g-Pr	CF3	н	
	Me	MeC=C	r	c-Pr	cr ₃	F	
10	Me	MeC=C	Cl	<u>c</u> -Pr	CF ₃	cı	
10	Me	MeC=C	Me	g-Pr	сизоси2	Me	
	Me	MeC=C	CF3CH2O	c-Pr	CF3CH2O	CF3CH2O	
	Me	Cl	CF ₃	g-Pr	MeS	CF3	
15	Me	CF ₂ Cl	MeO	<u>c</u> -Pr	CH ₂ =C(Et)	MeO	
	i-Pr	CF ₃	н	g-Pr	сн ₂ -снсн ₂	H	
	i-Pr	sec-Bu	F	C-Pr	<u>t</u> -BuO	F	
20	i-Pr	CF ₃	Cl	Q-Pr	HCF ₂ O	Cl	
20	i-Pr	CF ₃	Ме	<u>c</u> -Pr	сн ₂ -снсн ₂ о	Me	
	i-Pr	CF ₃	CF3CH2O	<u>c-</u> Pr	MeC≡CCH ₂ O	CF ₃ CH ₂ O	
	i-Pr	Et	CF3	c-br	NMe ₂	cr ₃	
25	i-Pr	MeO	MeO	<u>c-Pr</u>	NHEt	MeO	
	Et	<u>c</u> -Pr	н	Cl	cı	Н	
	Et	MeC≖C	F	Cl	CI	F	
30	Et	CH ₂ F	CI	·Cl	Cl	Cl	
	Et	CF ₃ CH ₂ O	Ме	Cl	Cl	Me	
	Et	<u>i</u> -Pr	CF3CH2O	сн3с≖с	Cl	CF3CH2O	
0.5	Et	n-Bu	CF ₃	сн3с≖с	F	CF3	
35	Et	нс≡ссн₂о	MeO	CH3C≖C	CH ₃ OCH ₂	MeO	
	<u>t</u> -Bu	Br	Cl	ocr3	sec-Bu	Cl	
	Ph	$CF_3(CF_2)_3$	Me	ocr ₃	Br	Me	
40	Bzl	sec-BuS	CF3CH2O	ocr ₃	<u>i</u> -Pr	с г 3Сн2О	

TABLE 11

5

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R3 Y5 R Y N R2 N

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20	R3	is 4-Me; R ⁴	is Me; Y is N		R ³ is H; R	4 is Me; Y is CH
	R1	\mathbb{R}^2	E	R1	R^2	E
	н	4-Me	Ph	H	4-Et	Ph
25	н	4- <u>1</u> -Pr	2-Me-Ph	н	4- <u>sec</u> -Bu	2-Me-Ph
	н	4- <u>n</u> -Bu	2-C1-Ph	н	4-CF3(CF2)3	2-C1-Ph
	н	4-CN	2-MeO-Ph	н	4- <u>t</u> -Bu	2-MeO-Ph
	H	4-CF3	2-CF3CH2O-Ph	н	4-FCH ₂	2-CF3CH2O-Ph
30	н	4-CF3CH2	1-naphthalenyl	Н	4- <u>n</u> -Pr	1-naphthalenyl
	1-Pr	4-Me	Ph	Me	5-Me	Ph
	<u>i</u> -Pr	4-Me	2-Me-Ph	Me	5-Me	2-Me-Ph
35	<u>1</u> -Pr	4-Me	2-C1-Ph	Me	5-Me	2-C1-Ph
	<u>i</u> -Pr	4-Me	2-MeO-Ph	Me	5-Me	2-MeO-Ph
	i-Pr	4-Me	2-CF3CH2O-Ph	Me	5-Me	2-CF3CH2O-Ph
	Cl	н	Ph	Br	н	Ph
40	r	н	2-Me-Ph	CN	н	2-Me-Ph
	CF3CF2	н	2-Cl-Ph	Ac	н	2-C1-Ph

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R ³ is 4-Me; R ⁴ is Me; Y is N			R ³ is H;	R ⁴ is t	de; Y is CH	
5	R ¹	B ²	E	R ¹	R ²	E
Ū	CH ₂ =CHCH ₂	н	2-MeO-Ph	сн3с≖ссн2	H	2-MeO-Ph
	CO ₂ Me	н	2-CF3CH2O-Ph	co ₂ Et	H	2-CF3CH2O-Ph
	2-Me-Ph	н	Ме	4-Cl-Ph	H	Ph
10	Bzl	H	Ph	5-Me-3-furyl	н	i-Pr
	2-naphthalenyl	H	n-Bu	EtCO	н	2-C1-Ph
	3-thienyl	н	CF3CF2	2-furyl	5-Me	CF ₃
15	3-pyridyl	н	Me	Ph	4-Me	Me
	CN	4-Me	Ph	C2N	5-Me	Ph
	<u>t</u> -Bu	4-Me	2-Me-Ph	<u>t</u> -Bu	5-Me	2-Me-Ph
	C1CH ₂	4-Me	2-C1-Ph	FCH ₂	5-Me	2-C1-Ph
20	Et	4-Me	2-MeO-Ph	Et	5-Me	2-MeO-Ph
	n-Pr	4-Me	2-CF3CH2O-Ph	C1 (CH ₂) 4	5-Me	2-CF3CH2O-Ph
	Me	5-Me	2-CF3-Ph	Ме	5-Me	2-CF3-Ph
25	i-Pr	5-Me	2-CF3-Ph	<u>i</u> -Pr	4-CN	2-CF3-Ph
	CF ₃	.5-CF3	2-CF3-Ph	CF ₃	4-Me	2-CF ₃ -Ph
	Me	5-Me		<u>1</u> -Pr	5-Me	2-TMS-Ph
30				•		

TABLE 12

5	R ³
10	N N R ⁵
15	$ \begin{array}{c c} & & \\$

20		R ⁷	is H; R ³ is	Me; R ⁴ is	Me; n is 1	
20	R ¹	B ⁵	R ⁶	R ¹	R ⁵	R6
	H	H	н	H	н	4-F
	н	F	н	H	F	4-F
25	н	Cl	н	H	Cl	4-F
	н	Me .	н	Н	Me	4-F
	н	CF3CH2O	н	H	CF3CH2O	4-F
30	н	CF3	н	н	CF3	4-F
	н	MeO	н	H	MeO	4-F
	н	н	4-C1	Me	Н	Н
	Me	r	5-F	Me	F	H
35	Me	Cl	5-Cl	Me	Cl	H
	Me	Me	4-F	Me	Me	н
	Me	CF3CH2O	4-F	Me	CF3CH2O	н
40	Me	CF3	4-F	Me	CF3	H
	Me	MeO	4-F	Me	MeO	H
	н	н	3-CF3	Et	н	Н
45	н	F	6-F	Et	F	H
	н	Cl	6-C1	Et	Cl	Ħ
	н	Me	6-Me	Et	Me	н
	н	сг ₃ сн ₂ о	6-Me	Et	СБ3СН20 ⋅	Н

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			R ⁷ is H; R ³ is	Me; R4 i	s Me; n is	1
	B1	B ⁵	R ⁶	R1	R ⁵	R ⁶
5	н	CF3	6-Me	Et	cr ₃	H
	н	MeO	6~MeO	Et	MeO	H
	н	н	4-Br	<u>i</u> -Pr	H	Н
10	Me	F	6~F	<u>i</u> -Pr	F	н
	Me	Cl	6-C1	i-Pr	CI	H
	Me	Me	6-Ma	1-Pr	Me	н
	n-Pr	CF3CH2O	н	i-Pr	CF3CH2O	H
15	<u>t</u> -Bu	CF3	н	i-Pr	CF ₃	H
	sec-Bu	MeO	н -	1-Pr	MeO	H
	H	HCF ₂ O	н	н	<u>i</u> -Pr	н
20	H	Br	н	Н	I	н
	H	<u>t</u> -BuO	Ĥ	н	EtO	Н
25			R ⁷ is H; R ³ i	•		
	R1	R ⁵	₽ ⁶	R1	E ⁵	\mathbb{R}^6
	H	Н	н	H	Н	4-F
	H	F .	н	н	F	4-F
30	Н	Cl	н	H	C1	4-F
	H	Me	н	н	Me	4-F
	н	CF3CH2C	н	H	CF3CH2C	
35	H	CF3	н	H	CF ₃	4-F
	Н	MeO	н	н	MeO	4-F
	н	Н	4-C1	Me	н	н
40	Me	F	5-F	Me	F	н
**	Me	Cl	5-C1	Me	Cl	H
	Me	Me	4-F	Me	Me	Н
	Me	CF3CH2O	4-F	Me .	CF3CH2O	
45	Me	CF ₃	4-F	Me	CF3	H
	Me	MeO	4-F	Me	MeO	H

			R^7 is H ; R^3 is	Me; R4 is	H; n is 1	
	R ¹	B ⁵	B6	R ¹	B ⁵	R ⁶
5	н	н	3-CF3	Et	H	Н
8	н	F	6-F	Et	F	H
	н	Cl	6-C1	Et	Cl	H
	н	Мо	6-Me	Et	Me	н -
10	Н	CF3CH2O	6-Me	Et	CF3CH2O	H
	н	CF3	6-Me	Et	CF ₃	н
	н	MeO	6-MeO	Et	MeO	H
15	н	н	4-Br	<u>i-Pr</u>	H	H .
	Me	F	6-F	i-Pr	F	Н
	Ме	Cl	6-C1 '	<u>i</u> -Pr	Cl	H
	Me	Me	6-Me	<u>i</u> -Pr	Me	H
20	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CF3CH2O	Н
	<u>t</u> -Bu	CF3	н	<u>i</u> -Pr	CF ₃	н
	sec-Bu	MeO	н	i-Pr	MeO	H
25	н	NO ₂	6-C1	Me	CN	6-CN
	н	Br	6-Br	Me	MeS (0) 2	4-F
	н	HCF ₂ O	4-Me0	Me	i-Pr	H
30						
•	R ⁴ i	s Me; R ⁶ an	d R ⁷ are H;	R ¹ ,	, \mathbb{R}^6 and \mathbb{R}^7	are H;
		n is	1		n is 1	
	B1	R3	R ⁵	₽ 3	B ⁴	R ⁵
35	Н	c-Pr	н	c-Pr	c-Pr	H
	н	g-Pr	F	g-Pr	<u>c-Pr</u>	F
	Н	c-Pr	C1	g-Pr	c-Pr	CI
40 .	н	g-Pr	Me	<u>c</u> -Pr	c-Pr	Me
	н	C-br	сг 3СН2О	<u>c</u> -Pr	CH ₃ C≖C	CF3CH2O
	н	c-Pr	CF3	c-Pr	CH ₃ C = C	CF ₃

R4 is Me; R6 and R7 are H;				R^{1} , R^{6} and R^{7} are H;			
		n is 1			n is 1		
5	\mathbb{R}^1	R ³	R5	R3	B ⁴	R ⁵	
	н	g-Pr	MeO	g-Pr	CH3C≡C	MeO	
	Me	MeCwC	н	c-Pr	Cr ₃	- H	
10	Me	MeC=C	r	g-Pr	CF ₃	F	
	Me	MeC=C	C1	g-Pr	CF ₃	Cl	
	Me	MeC=C	Me	c-Pr	сн ₃ осн ₂	Me	
15	Me	MeC=C	CF3CH2O	g-Pr	CF3CH2O	CF3CH2O	
,	Me	Cl	CF3	_c-Pr	MeS	CF3	
	Me	CF ₂ Cl	MeO	g-Pr	CH2=C (Et)	MeO	
	i-Pr	CF ₃	н.	c-Pr	CH2=CHCH2	H	
20	<u>i</u> -Pr	sec-Bu	r	c-Pr	<u>t</u> -BuO	F	
	i-Pr	CF ₃	C1	C-Pr	HCF ₂ O	Cl	
	<u>i</u> -Pr	CF3	Me	c-Pr	сн ₂ -снсн ₂ о	Me	
25	i-Pr	CF ₃	CF3CH2O	g-Pr	MeC≡CCH ₂ O	CF3CH2O	
	i-Pr	Et	CF3	g-Pr	NMe ₂	CF3	
	<u>i</u> -Pr	MeO	MeO	c-Pr	NHEt	MeO	
30	Et	<u>c</u> -Pr	н	Cl	Cl	H	
30	Et	MeC≖C	F	Cl	Cl	F	
	Et	CH ₂ F	Cl	Cl	Cl	Cl	
	Et	CF3CH2O	Ме	Cl	Cl	Me	
35	Et	<u>i-Pr</u>	CF ₃ CH ₂ O	сн₃с≖с	Cl	CF3CH2O	
	Et	n-Bu	CF ₃	CH ₃ C≡C	F	CF ₃	
	Et	нс≖ссн ₂ о	MeO	сн3с≖с	CH ₃ OCH ₂	MeO	
40	<u>t</u> -Bu	Br	Cl	ocr ₃	sec-Bu	Cl	
	Ph	CF3 (CF2) 3	Me	ocf ₃	Br	Me	
	Bzl	sec-BuS	CF3CH2O	OCF3	<u>1</u> -Pr	CF3CH2O	

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TABLE 13

5			R ³	N R ⁴		
15			R ¹	6 5	1)3/ _R 6/ _R 7	
20			R ⁷ is H;	R ³ is Me	R ⁴ is Me	
	R1	R ⁵	R ⁶	B1	R ⁵	B 6
	H	н	H	н	H	4-F
25	Н	F	H	н	F	4-F
	H	Cl .	H	н	C1	4-F
	н	Me	Н	н	Me	4-F
30	H	CF3CH2O	H	н	CF3CH2O	4-F
30	н	CF3	Н	н	CF ₃	4-F
	H	MeO	н	н	MeO	4-F
	н	н	4-C1	Me	H	Н
35	Me	F	5-F	Me	F	H
	Me	C1	5-C1	Me	Cl	н
	Me	Me	4-F	Me	Me	н
40	Me	с г 3сн ₂ о	4-F	Me	CF3CH2O	H

4-F

4-F

6-F

6-C1

6-Me

6-Me

3-CF3

Me

Me

Et

Et

Et

Et

Et

CF3

MeO

H

F

Cl

Me

CF3CH2O

Н

н

H

н

н

Н

H

55

45

50

Me

Me

H

H

Н

H

H

CF3

MeO

H

F

Cl

ме

CF3CH2O

			R ⁷ is H;	R ³ is Me;	R ⁴ is Me	
	R1	B ⁵	R ⁶	B1	R ⁵	R ⁶
5	н	CF3	6-Me	Et	CF ₃	н
	H	MeO	6-MeO	Et	MeO	H
	H	H	4-Br	<u>1</u> -Pr	H .	H
10	Me	r	6-F	i-Pr	r	н
	Me	Cl	6-C1	i-Pr	Cl	H
	Me	Me	6-Ме	i-Pr	Me	H
	n-Pr	CF3CH2O	н	i-Pr	CF ₃ CH ₂ O	H
15	<u>t</u> -Bu	CF ₃	H	1-Pr	cr ₃	H
	sec-Bu	MeO	H ·	1-Pr	MeO	н
	H	HCF ₂ O	H	н	HCF ₂ O	6-HCF20
20	H	Br	н .	н	I	H
	H	<u>t</u> -BuO	Н	н	EtO	H
25				R ³ is Me;		
	R ¹	B ⁵	R6	R ¹	R ⁵	R ⁶
	н	H	н	н	н	4-F
	H	F	н	H	F ·	4-F
30	H	Cl	н	н	Cl	4-F
	H	Me	н	н	Me	4-F
	H	CF3CH2O	H	н	CF3CH2O	4-F
35	H	CF3	н	н	CF ₃	4-F
	H	MeO	н	Н	MeO	4-F
	H	н	4-C1	Me	H	H
40	Me	F	5-F	Me	F	H
	Me	Cl	5-C1	Me	Cl	Н
	Me	Me	4-F	Me	Me	Н
	Me	CF3CH2O	4-F	Me	CF3CH2O	H
45	Me	CF3	4-F	Me	CF ₃	н
	Me	MeO .	4-F	Me	MeO	H

			R^7 is H; R^3	is Me; R	⁴ is H	
	R ¹	R ⁵	B ⁶	R1	B ⁵	R6
5	H	н	3-CF ₃	Et	н .	H :
	н	r	6-F	Et	r	н
	н	Cl	6-C1	Et	CI	H
	н	Me	6-Me	Et	Me	H
10	н	ст ₃ сн ₂ о	6-ме	Et	CF3CH2O	H
	н	CF3	6-Me	Et	cr ₃	н
	н	MeO	6-MeO	Et	MeO	H
15	н	н	4-Br	i-Pr	H	н
	Me	F	6-F	1-Pr	F	H
	Me	Cl	6-CI	<u>i</u> -Pr	Cl	н
20	Me	ме	6-Me.	<u>i</u> -Pr	Me	н
	n-Pr	CF3CH2O	н	1-Pr	CF3CH2O	H
	<u>t</u> -Bu	CF ₃	н	<u>i</u> -Pr	CF3	H
	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	H
25	н	HCF ₂ O	н	Ħ	HCF ₂ O	6-HCF2O
	н	Br	H a	н	ı	H
	н	t-BuO	н	Н	EtO	н
30			1			
	R4 1:	s Me; R ⁶ an	d R ⁷ are H;		, R^6 and R^7	are H;
	B1	R ³	R ⁵	R ³	R ⁴	R ⁵
35	н	g-Pr	н	c-Pr	g-Pr	H
35	н	g-Pr	F	C-br	c-Pr	F
	н	g-Pr	Cl	C-bi	c-Pr	Cl
	н	c-Pr	Me	C-Pr	<u>c</u> -Pr	Me
40	н	<u>c-Pr</u>	CF3CH2O	C-br	CH3C≖C	CF3CH2O
	н	<u>c</u> -Pr	CF ₃	g-Pr	CH ₃ C=C	CF3

	R4	is Me; R ⁶ and	R7 are H	· R1	, R ⁶ and R ⁷	are H
	R ¹	ß3	R ⁵	R ³	R4	B ⁵
	н	g-Pr	MeO	g-Pr	CH ₃ C≕C	MeO
5	Me	MeC=C	н	g-Pr	CF3	H
	Me	MeCmC	F	C-Pr	cr ₃	r
	Me	MeCmC	C1	<u>c</u> -Pr	CF3	CI
10	Me	MeC=C	Me	<u>c</u> -Pr	CH3OCH2	Me
	Me	MeC=C	CF3CH2O	c-Pr	CF3CH2O	CF3CH2O
	ме	ĊL	cr ₃	c-Pr	MeS	CF ₃
15	Me	CF ₂ C1	MeO	g-Pr	CH2-C (Et)	MeO
15	<u>i</u> -Pr	CF3	н,	<u>c</u> -Pr	сн ₂ -снсн ₂	Н
	i-Pr	sec-Bu	F	c-Pr	<u>t</u> -BuO	F
	<u>i</u> -Pr	CF3	CI	c-Pr	HCF ₂ O	CI
20	<u>1</u> -Pr	CF3	Me	g-Pr	СH ₂ -СНСH ₂ O	Me
	i-Pr	CF3	CF3CH2O	c-Pr	MeC≡CCH ₂ O	CF3CH2O
	<u>i</u> -Pr	Et	Cr ₃	c-Pr	NMe ₂	CF3
25	i-Pr	MeO	MeO	<u>c</u> -Pr	NHEt	MeO
	Et	c-Pr	н	CI	Cl	Н
	Et	MeC≆C	F	Cl	Cl	F
	Et	CH ₂ F	CI	CI	Cl	Cl
30	Et	CF3CH2O	Me	Cl	Cl	Me
	Et	i-Pr	CF3CH2O	сн3с≖с	CJ	CF3CH2O
	Et	n-Bu	CF3	сн3с≖с	F	CF ₃
35	Et	HC=CCH ₂ O	MeO	сн ₃ с≖с	сн ₃ осн ₂	MeO
	<u>t</u> -Bu	Br	Cl	ocr ₃	sec-Bu	Cl
	Ph	CF3 (CF2)3	Me	ocr ₃	Br	Me
40	Bzl	sec-BuS	CF3CH2O	ocr ₃	<u>i</u> -Px	CF3CH2O

TABLE 14

5			R ³	R ⁽	4	
10				N N		
15			R ¹⁰ 5	E R8		
20			R^9 3 R^3 and R^4	are Me; R ¹⁰	is H	
		R ⁸	R ⁹	E	R ⁸	\mathbb{R}^9
	E	н	н	н	н	4-F
25	Н	r F	н	н	F	4-F
	н		н	н	Cl	4-F
	н	C1	н	н	Me	4-F
30	н	Me	H	н	CF3CH2O	4-F
	н	CF3CH2O	н	н	CF ₃	4-F
	н	CF ₃	H H	н	MeO	4-F
	н	MeO	4-Cl	Me	н	Н
35	Ħ	H	5-F	Me	F	H
	Me	F	5-C1	Me	Cı	Н
	Me	CI	4-F	Me	Me	H
40	Me	Me	4-F	Me	CF3CH2O	н
	Me	CF3CH2O	4-F	Me	CF ₃	н
	Me	CF ₃	4-F	Me	MeO	н
16	Me	MeO		Et	н	н
45	н	Н	3-CF3	Et	F	н
	н	F	6-F	Et	Cl	н
	н	Cl	6-C1		No.	H

55

50

Me

CF3CH2O

6-Me

6-Me

Н

н

Me

CF3CH2O

			p3 and p4	are Me; F	10 is H	
5	_	R ⁸	R ⁹	E	R8	R ⁹
	E	CF3	6-Ma	Et	CF ₃	н
	Н	MeO	6-MeO	Et	MeO	H
	H		4-Br	i-Pr	н	н
10	Н	H	6-F	i-Pr	r	н
	Me	F	6-C1	i-Pr	C1	H
	Me	C1	6-Me	i-Pr	Me	н
15	Me	Me		1-Pr	CF3CH2O	H
	n-Pr	CF3CH2O	H		Cr ₃	H :
	<u>t</u> -Bu	CF3	н .	<u>i</u> -Pr	MeO	н
	sec-Bu	MeO	H	<u>i</u> -Pr		 6-нсг ₂ 0
20	Ph	HCF2O	Н	н	HCF ₂ O	н н
	Н	Br	н .	Ph	I	
	н	±-BuO	н	Н	EtO	H
25			3	_41	0	
		•		R ⁴ and R ¹		_ 0
	E	R ⁸	R ⁹	E	B ⁸	R ⁹
	Н	Н	н	H	H	4-F
30	Н	F .	н	H	F Cl	4-F 4-F
	Н	Cl	н	H		
	H	Me	н	H	Ме	4-F
35	н	CF3CH2O	H	H	CF3CH2O	
	H	CF ₃	н	н	CF3	4-F
	н	MeO	н	н	MeO	4-F
	H	Н	4-C1	Me	H	H
40	Me	F	5 - F	Me	F	Н
	Me	Cl	5-Cl	Me	Cl	H
	Me	Me	4-F	Me	Me	н
45	Me	CF3CH2O	4-F	Me	сғ ₃ сн ₂ о	H
	Me	CF ₃	4-F	Me	CF ₃	H
	Me	MeO	4-F	Me	MeO	н

			R ³ is Me; 1	R ⁴ and R ¹	0 are H	
	E	B ⁸	R ⁹	E	B8	R ⁹
5	н	н	3-CF3	Et	Н	H
	н	r	6-F	Et	F	н
	н	Cl	6-C1	Et	Cl	H
	н	Me	6-Me	Et	Me	н
10	H	CF3CH2O	6-Me	Et	CF3CH2O	н
	н	cr ₃	6-Me	Et	Cr3	H
	н	MeO	6-MeO	Et	MeO	н
15	H	н	4-Br	i-Pr	H ·	Н
	Me	F	6-F	i-Pr	F	H
	Me	Cl	6-C1	<u>i</u> -Pr	Cl	н
20	Me	Me	6-Me.	i-Pr	Me	н
20	n-Pr	сг ₃ сн ₂ о	н	<u>i-Pr</u>	CF3CH2O	н
	<u>t</u> -Bu	CF3	н	i-Pr	CF ₃	H
	sec-Bu	MeO	н	i-Pr	MeO	н
25	Ph	HCF ₂ O	4-MeO	н	HCF ₂ O	6-HCF ₂ O
	н	Br .	н	Ph	I	н
	H	t-BuO	н	н	EtO	н
30						
	R ⁴ is	Me; R ⁹ and			nd R ¹⁰ are	H; E is Me
	E	R ³	R ⁸	R ³	R ⁴	B ⁸
	H	c-Pr	н	<u>c</u> -Pr	c-Pr	Н
35	H	<u>c-Pr</u>	F	c-Pr	<u>c</u> -Pr	F
	н	<u>c</u> -Pr	C1	c-Pr	C-Pr	Cl
	н	c-Pr	Ме	<u>c</u> -Pr	c-Pr	Me
40	н	<u>c</u> -Pr	CF3CH2O	c-Pr	CH3C≖C	сг ₃ сн ₂ о
	н	c-Pr	CF ₃	C-Pr	CH3C=C	CF ₃

	R4	is Me; R ⁹ and 1	R10 are H	R ⁹ an	d R ¹⁰ are H;	E is Me
	E	R ³	R ⁸	R ³	R ⁴	R ⁸
5	н	c-Pr	MeO	g-Pr	сн³с≖с	MeO
	Me	MeC=C	н	c-Pr	CF ₃	н
	Ме	MeC=C	r	<u>c</u> -Pr	CF ₃	F
10	Me	MeC=C	cı	<u>c</u> -Pr	cr ₃	Cl
	Me	MeC=C	Me	c-Pr	СH ₃ ОСН ₂	Me
	Me	MeC=C	ст ₃ сн ₂ о	c-Pr	CF3CH2O	CF3CH2O
15	Me	Cl	CF ₃	<u>c</u> -Pr	MeS	cr ₃
10	Me	CF ₂ C1	MeO	c-Pr	CH ₂ -C(Et)	MeO
	i-Pr	CF3	н	C-Pr	сн ₂ =снсн ₂	H
	i-Pr	sec-Bu	F.	<u>c</u> -Pr	<u>t</u> -BuO	F
20	<u>i</u> -Pr	CF3	Cl	g-Pr	HCF ₂ O	Cl
	<u>i</u> -Pr	CF ₃	Me	c-Pr	СH ₂ =СНСН ₂ О	Me
	i-Pr	CF3	CF3CH2O	c-Pr	MeC=CCH2O	CF3CH2O
25	<u>i</u> -Pr	Et	CF ₃	<u>c</u> -Pr	NMe ₂	CF3
	<u>i</u> -Pr	MeO	MeO	<u>c</u> -Pr	NHEt	MeO
	Et	g-Pr	H	Cl	Cl	H
	Et	MeC = C	F	Cl	Cl	F
30	Et	CH ₂ F	Cl	Cl	Cl	CI
	Et	CF3CH2O	Me	Cl	Cl	Me
	Et	<u>1</u> -Pr	CF3CH2O	CH3C=C	Cl	CF3CH2O
35	Et	<u>n</u> -Bu	CF ₃	сн₃с с	F	CF3
	Et	нс = ссн ₂ о	MeO	CH3C≖C	CH ₃ OCH ₂	MeO
	<u>t</u> -Bu	Br	Cl	ocr3	sec-Bu	CI
40	Ph	CF3 (CF2) 3	Me	ocr ₃	Br	Me
-10	Bzl	sec-BuS	CF3CH2O	ocr ₃	i-Pr	CF3CH2O

TABLE 15

 $\mathbb{R}^3 \longrightarrow \mathbb{R}^4$ $\mathbb{R}^2 \longrightarrow \mathbb{N}$ $\mathbb{R}^2 \longrightarrow \mathbb{N}$ $\mathbb{R}^2 \longrightarrow \mathbb{N}$

		R ³ is Me	e; R ⁴ is Me	1	R ³ is	H; R ⁴ is Me
20	$\mathbf{R^1}$	R ²	E	R1	R ²	E
	Ħ	Me	Ph	н	Et	Ph
	н	<u>i</u> -Pr	2-Me-Ph	н	<u>sec</u> -Bu	2-Me-Ph
25	н	n-Bu	2-C1-Ph	н	CF3 (CF2) 3	2-C1-Ph
	н	CN .	2-MeO-Ph	н	<u>t</u> -Bu	2-MeO-Ph
	н	CF ₃	CF3CH2O-Ph	н	FCH ₂	2-cf3CH2O-Ph
	H	CF3CH2	1-naphthalenyl	Ħ	n-Pr	1-naphthalenyl
30	i-Pr	Me	Ph	Me	Me	Ph
	i-Pr	Me	2-Me-Ph	Me	Me	2-Me-Ph
	i-Pr	Me	2-Cl-Ph	Me	Me	2-C1-Ph
35	1-Pr	Me	2-MeO-Ph	Me	Me	2-MeO-Ph
	<u>i</u> -Pr	Me	2-CF3CH2O-Ph	Me	Me	2-CF3CH2O-Ph
	CI	Н	Ph	Br	н	Ph
	F	н	2-Me-Ph	CN	н	2-Me-Ph
40	CF3CF2	H	2-Cl-Ph	Ac	H	2-C1-Ph

	R ³ is h	1e; R'	is Mo	R ³ is	H; R4	is Me
	R ¹	\mathbb{R}^2	E	R1	R ²	E
5	CH ₂ =CHCH ₂	н	2-MeO-Ph	сн ₃ с=ссн ₂	н	2-MeO-Ph
	CO2Me	н	2-CF3CH2O-Ph	∞ ₂ Et	H	2-CF3CH2O-Ph
	2-Me-Ph	н	Me	4-C1-Ph	H	Ph
10	Bzl	н	Ph .	5-Me-3-furyl	H	Ph
70	2-naphthalenyl	н	n-Bu	EtCO	H	1-Pr
	3-thienyl	H	CF3CF2	2-furyl	H	2-C1-Ph
	3-pyridyl	н	Me	Ph	Me	cr ₃
15	Ph	Me	н	Ph	Me	H
	2-Me-Ph	Me	н .	2-Me-Ph	Me	H
	2-C1-Ph	Me	н.	2-C1-Ph	Me	H
20	2-MeO-Ph	Me	н	2-MeO-Ph	Me	H
	2-CF3CH2O-Ph	Me	н	2-CF3CH2O-Ph	Me	н
	Ph	Me	n-Pr	Ph	<u>i-Pr</u>	Me
	Ph	Me	CF3	Ph	CF3	Me
25	Ph	Me	<u>i</u> -Pr	Ph	Et	Me
	Ph	Ме	sec-Bu	Ph	n-Bu	Me
			1			

TABLE 16

R³ Y R⁴

R² N N N E

R3 is H; R4 is Me; Y is CH R3 and R4 is Me; Y is N 20 B² \mathbb{R}^{1} E R² ·Ε £t Ph Н H Me 2-Me-Ph sec-Bu 2-Me-Ph <u>i-Pr</u> 2-C1-Ph CF3(CF2)3 2-C1-Ph n-Bu 25 <u>t</u>-Bu 2-MeO-Ph 2-MeO-Ph CN 2-CF3CH2O-Ph CF3CH2O-Ph FCH₂ н CF3 1-naphthalenyl 1-naphthalenyl н n-Pr CF3CH2 30 Me Ph Ph Me 1-Pr Me 2-Me-Ph 2-Me-Ph Me Me i-Pr Me 2-C1-Ph 2-C1-Ph Me i-Pr Me 2-MeO-Ph Me Me 2-MeO-Ph i-Pr 35 2-CF3CH2O-Ph 2-CF3CH2O-Ph Me Me <u>i-Pr</u> Me Br Ph H Ç1 H 2-Me-Ph CN Н 2-Me-Ph Н 2-C1-Ph н CF3CF2 H 2-C1-Ph A¢

45

5

15

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	R ³ and R ⁴	are :	Me; Yis N	R ³ is H;	R ⁴ is M	ie; Y is CH
	R ¹	R ²	E	R ¹	R ²	E
5	CH2=CHCH2	н	2-MeO-Ph	сн₃с=ссн₂	H	2-MeO-Ph
	CO ₂ Me	н	2-CF3CH2O-Ph	CO ₂ Et	H	2-CF3CH2O-Ph
	2-Me-Ph	H	Me	4-C1-Ph	н	Ph
10	Bzl	н	Ph	5-Me-3-furyl	н	i-Pr
	2-naphthalenyl	H	n-Bu	EtCO	н	2-C1-Ph
	3-thienyl	н	cr3cr2	2-furyl	H	CF ₃
	3-pyridyl	H	Ме	Ph	Me	Me
15	Ph	Me	н	Ph	Me	H .
	2-Me-Ph	Me	н	2-Me-Ph	Me	н
	2-C1-Ph	Me	н	2-Cl-Ph	Me	н
20	2-MeO-Ph	Me	н .	2-MeO-Ph	Me	н
	2-CF3CH2O-Ph	Me	н	2-CF3CH2O-Ph	Me	н
	Ph	Me	n-Pr	Ph	i-Pr	Me
	Ph	Me	CF3	Ph	CF3	Me
25	Ph	Me	i-Pr	Ph	Et	Ме
	Ph	ме	sec-Bu	Ph	n-Bu	Me

TABLE 17

5	R ³
10	N N
15	\mathbb{R}^1 \mathbb{R}^5 \mathbb{R}^5
	6 5 R7

20						
			R ³ and F	⁴ are Me; 1	R ⁷ is H	
	\mathbb{R}^1	R ⁵	R ⁶	R ¹	R ⁵	\mathbb{R}^6
	н	н	H	н	н	4-F
25	н	F	H	н	F	4-F
	н	Cl	н	н	C1	4-F
	Н	Me	н	н	Me	4-F
30	н	CF3CH2O	Н	н	CF3CH2O	4-F
	н	cr ₃	H	н	CF3	4-F
	H	MeO	H	н	MeO	4-F
35	н	Н	4-C1	Me	H	H
35	Me	F	5-F	Me	F	H
	Me	Cl	5-C1	Me	Cl	H
	Me	Me	4-F	Me	Me	н
40	Me	CF3CH2O	4-F	ме	сг ₃ сн ₂ о	H
	Me	CF3	4-F	Me	CF3	H
	Me	MeO	4-F	Me	MeO	Н
45	H	H	3-CF3	Et	н	Н
	H	F	6-F	Et	F	н
	н	c1	6-C1	Et	Cl	H
50	H	Me	6-Ме	Et	Me	н
30	н	сг ₃ сн ₂ о	6-Me	Et	сг ₃ сн ₂ о	н

			R ³ and R	are Me;	R ⁷ is H	
	B1	R ⁵	R ⁶	R1	B ⁵	R ⁶
5	Н	cr ₃	6-Me	Et	CF3	н
	Н	MeO	6-MeO	Et	MeO	Н
	Н	н	4-Br	i-Pr	H	H
	Me	F	6-F	i-Pr	F	H
10	Me	Cl	6-C1	i-Pr	Cl	н
	Me	Ме	6-Me	i-Pr	Me	н
	n-Pr	CF3CH2O	н	i-Pr	CF3CH2O	H
15	t-Bu	CF ₃	н	1-Pr	cr ₃	H
	sec-Bu	MeO	H .	1-Pr	MeO	н
	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF ₂ O
20	н	Br	н	н	r	Н
20	Н	t-BuO	н	н	EtO	Н
			\mathbb{R}^3 is Me	R4 and R		
25	R ¹	R ⁵	\mathbb{R}^6	R ¹	R ⁵	R6
	Ħ	н	н	н	H	4-F
	н	F .	н	н	F	4-F
30	н	Cl	н	н	Cl	4-F
	н	Me	н	H	Me	4-F
	н	сг ₃ сн ₂ о	н	н	CF3CH2O	4-F
	н	CF ₃	H	н	CF ₃	4-F
35	Н	MeO	H	н	MeO	4-F
	н	н	4-C1	Me	Н	н
	Me	F	5- F	Me	F	н
40	Me	Cl	5-C1	Me	Cl	н
	Me	Me	4-F	Me	Me	н
	Ме	CF3CH2O	4-F	Me	CF3CH2O	н
45	Me	CF3	4-F	Me	CF ₃	н
	Me	MeO	4-F	Me	MeO	H

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			R ³ is Me; R	4 and R^7	are H	
	\mathbb{R}^1	B ⁵	R ⁶	R ¹	R ⁵	R ⁶
5	Н	н	3-CF3	Et	H	H
	н	F	6-F	Et	F	H
	н	c1	6-C1	Et	Cl	H
10	н	Ме	6-Ме	Et	Me ·	H
	н	CF3CH2O	6-Me	Et	CF3CH2O	H
	н	CF ₃	6-Me	Et	CF ₃	H
	н	MeO	6-MeO	Et	MeO	H
15	н	н	4-Br	1-Pr	Н	H
	Me	F	6-F	<u>i</u> -Pr	F	н
	Ме	Cl	6-C1	<u>i</u> -Pr	Cl	H
20	Me	Me	6-Me	<u>i</u> -Pr	Me	H
	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CF3CH2O	Н
	<u>t</u> -Bu	CF3	н	<u>i</u> -Pr	CF ₃	Н
25	sec-Bu	MeO	н	i-Pr	MeO	н
20	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF ₂ O
	н	Br .	н	н	I	Н
	н	<u>t</u> -BuO	н	н	EtO	H
30						
	R ⁴ is	Me; R ⁶ and	d R ⁷ are H		R^6 and R^7	
	R ¹	B 3	B ⁵	B ³	R ⁴	R ⁵
35	H	<u>c</u> -Pr	н	<u>c</u> -Pr	C-br	H
	Н	<u>c</u> -Pr	F	<u>c</u> -Pr	C-br	F
	H	c-Pr	Cl	c-Pr	g-Pr	CI
	н	c-Pr	Ме	<u>c</u> -Pr	<u>c</u> -Pr	Me
40	н	<u>c</u> -Pr	CF3CH2O	<u>c</u> -Pr	сн3с≖с	сг ₃ сн ₂ о
	н	<u>c</u> -Pr	CF ₃	<u>c-Pr</u>	CH3C≖C	cr ₃

	n4	is Me; R ⁶ and	R ⁷ are H	R1	, R ⁶ and R ⁷	are H
	R ¹	R ³	R ⁵	R ³	B ⁴	R ⁵
5	H.	g-Pr	MeO	g-Pr	сн₃с=с	MeO
	ме	HeC=C	я	g-Pr	CF ₃	н
	Me	MeC=C	r	c-Pr	CF3	F
10	Me	MeOmC	C1	g-Pr	CF3	Cl
	Me	MeC=C	Me	<u>c</u> -Pr	сн ₃ осн ₂	Me
	Me	MeO=C	сг ₃ сн ₂ о	g-Pr	CF3CH2O	CF3CH20
	Me	C1	CF ₃	c-Pr	MeS	CF3
15	Me Me	CF ₂ Cl	MeO	c-Pr	CH ₂ =C (Et)	MeO
	i-Pr	CF ₃	н	g-Pr	сн2-снсн2	Н
20	i-Pr	gec-Bu	F	c-Pr	<u>t</u> -BuO	F
	i-Pr	CF3	C1	g-Pr	HCF2O	Cl
	i-Pr	CF ₃	Me	c-Pr	сн ₂ =снсн ₂ о	Me
	i-Pr	CF ₃	CF3CH2O	c-Pr	MeC=CCH2O	CF3CH2O
25	i-Pr	Et	CF ₃	g-Pr	NMe ₂	CF3
20	i-Pr	MeO	MeO	<u>c</u> -Pr	NHEt	MeO
	Et	c-Pr	н	Cl	Cl	н
	Et	MeC≖C	F	Cl	Cl	F
30	Et	CH ₂ F	Cl	Cl	Cl	Cl
	Et	CF3CH2O	Ме	Cl	Cl	Me
	Et	1-Pr	CF3CH2O	CH ₃ C≡C	Cl	CF3CH20
35	Et	n-Bu	CF ₃	CH3C≡C	F	CF3
	Et	HC≡CCH ₂ O	MeO	сн₃с=с	сн ₃ осн ₂	MeO
	±-Bu	Br	cı	OCF ₃	sec-Bu	Cl
40	Ph	CF ₃ (CF ₂) ₃	Me	OCF3	Br	Me
40	Bzl	sec-BuS	CF3CH2O	ocr ₃	<u>i-Pr</u>	CF3CH2O

TABLE 18

•	R ³ Y R ⁴
10	Y N
	R ²
15	R ¹ E

20	ır.	3 and R4 ar	e Me; Y is N		R ³ is H;	R ⁴ is Me; Y is CH
	R1	R ²	E	R1	B ²	E
	Н	Me	Ph	Н	Et	Ph
	н	<u>i</u> -Pr	2-Me-Ph	н	sec-Bu	2-Me-Ph
25	н	n-Bu	2-C1-Ph	н	$CF_3(CF_2)_3$	2-C1-Ph
	н	CN	2-MeO-Ph	H	<u>t</u> -Bu	2-MeO-Ph
	н	CF3	CF3CH2O-Ph	H	FCH ₂	2-CF3CH2O-Ph
30	н	CF3CH2	1-naphthalenyl	H	n-Pr	1-naphthalenyl
30	<u>i</u> -Pr	Me	Ph	Me	Me	Ph
	<u>i</u> -Pr	Me	2-Me-Ph	Me	Me	2-Me-Ph
	i-Pr	Me	2-C1-Ph	Me	Me	2-C1-Ph
35 ⁻	i-Pr	Me	2-MeO-Ph	Me	Me	2-MeO-Ph
	<u>i-Pr</u>	ме	2-CF3CH2O-Ph	Me	Ме	2-с г ₃ сн ₂ о-рь
	Cl	н	Ph	Br	н	Ph
	F	н	2-Me-Ph	CM	H	2-Me-Ph
40	CF3CF2	н	2-C1-Ph	Ac	H	2-C1-Ph

	R ³ and R ⁴	are M	le; Y is N	R ³ is H; R ⁴	is Me	; Y is CH
5	R ¹	\mathbb{R}^2	E	B ¹	R ²	E
	сн ₂ -снсн ₂	н	2-MeO-Ph	сн ₃ с=ссн ₂	H	2-HeO-Ph
	CO ₂ Me	н	2-CF3CH2O-Ph	co ₂ Et	H	2-CF3CH2O-Ph
	2-Me-Ph	н	Me	4-C1-Ph	H	Ph
10	Bzl	н	Ph	5-Me-3-furyl	H	Ph
	2-naphthalenyl	H	n-Bu	EtCO	H	<u>1</u> -Pr
	3-thienyl	н	CF3CF2	2-furyl	H	2-Cl-Ph
15	3-pyridyl	н	Me	Ph	Me	cr ₃
	Ph	Me	н	Ph	Me	Ph
	2-Me-Ph	Me	н .	2-Me-Ph	Me	н
	2-C1-Ph	Ме	H	2-C1-Ph	Me	Н
20	2-MeO-Ph	Me	н	2-MeO-Ph	Me	Н
	2-CF3CH2O-Ph	Me	н	2-cf3CH2O-Ph	Me	Н
	Ph	Me	n-Pr	Ph	1-Pr	Me
25	Ph	Ме	CF ₃	Ph	CF3	Me
25	Ph	Me	<u>i</u> -Pr	Ph	Et	Me
	Ph	Me	sec-Bu	Ph	n-Bu	Me

TABLE 19

			R ³ i	s Me		1	R ³ is	Me; R ⁴	and R ¹⁸	together
25						ı		forms - (CH ₂) ₃ -	
	R1	R4	R18	R ⁵	B ⁶	R ⁷	R1	R ⁵	R ⁶	<u>R</u> 7
	H	OH	n-Bu	Cl	H	н	н	Cl	н	H
	H	ОН	n-Pr	Me	H	н	н	Me	н	H
30	H	ОН	Et	Me	Me	н	H	Et	н	Н
	Me	ОН	n-Bu	Cl	н	2-C1	Me	i-Pr	Н	н
	Et	ОН	n-Bu	н	MeO	н	Et	H	Me	H
35	н	Ph	H	Cl	н	н	H	Cl	H	2-C1
	Н	Ph	н	Ме	н	н	н	Me	Me	н
	н	Ph	н	Me	Me	н	H	Et	Et	н
	Me	Ph	H	CI	H	2-C1	Me	Me	Me	H
40	£t	Ph	н	H	MeO	н	Et	Me	н	R
	Н	TMS-CH ₂	н	Cl	Н	н	н	F	н	H
	н	TMS-CH ₂	н	Me	Н	н	H	H	Br	н
45	Н	TMS-CH ₂	н	Me	Me	н	н	MeO	н	H
	Me	TMS-CH ₂	н	Cl	н	2-C1	Me	H	MeO	H
	Et	TMS-CH2	н	H	MeO	н	Et	Cl	н	H

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			R ³ 1	в Ме			R ³ 1	s Me; R ⁴	and R ¹⁸	together
5								forms - (C		
,	B1	B ⁴	B18	R ⁵	B 6	B7	R1	R ⁵	R6	R ⁷
	н	Me	Cl	Me	Me	н	н	H	CI	Н
	н	Me	Br	Cl	н .	н	н	H	CF3	H
10	н	Me	Cl	Cl	н	н	н	H	F	H
	Me	Me	Br	r	н	н	Me	H	Cl	н
	Et	Me	Cl	CF3	Ħ	H				
15							1			
			•			10 .				
						i R ¹⁰ tog	1	forms - (CE		7
	\mathbf{R}^{1}	R ⁵	R6	F	ş ⁷		R ¹	R ⁵	R ⁶	R ⁷
20	н	Cı	H	F	ì		н	MeO	MeO	H
	н	Me	н	F	1		Me	MeO	H	2-MeO
	н	Et	H	F			Et	F	H	H
25	Me	<u>i</u> -Pr	н	F	I		н	CF ₃	н	H
	Et	н	Me	ŀ	ı		н	cr3ch20	н	Ĥ.
	H	cı	H	2	:-C1		н	HCF ₂ O	H	Н
	H	Me	Me	ŀ	ì		ме	EtO	н	H
30	H	Et	Et	i	ŧ		Et	Н	EtO	н
	Me	Me	Me	. F	ī		н	Н	Cl	н
	Et	Me	н	ŀ	ı		н	H	CF ₃	н
35	н	MeO	н	F	I		н	H	F	H
	н	н	MeO	ŀ	t		Me	Н	C1	н
							1			

TABLE 20

R ³ R ⁴
N N
N N 2 R ⁶
$ \begin{array}{c c} & 3 \\ & 6 \\ & 7 \\ & 5 \end{array} $

20			R ^З і	s Me			R ³ is	Me; R ⁴	and R ¹⁸	together
	R ¹	R ⁴	R18	R ⁵	₽6	R ⁷	;	forms -(CH ₂) ₃ -	
	н	OH	n-Bu	Cl	Н	н	B1	R ⁵	B6	B ⁷
25	н	ОН	n-Pr	Me	н	н	н	CI	H	Н
	н	ОН	Et	Me	Me	н	H	Me	н	Н
	Me	ОН	n-Bu	Cl	H	2-C1	н	Et	н	н
	Et	ОН	n-Bu	н	MeO	н	Me	<u>i-Pr</u>	H	H
30	н	Ph	н	Cl	н	н	Et	н	Me	н
	н	Ph	H	Me	Н	н	н	Cı	н	2-C1
	н	Ph	н	Me	Me	н	Н	Me	Me	H
35	Me	Ph	Н	Cl	н	2-C1	Ħ	Et	Et	H
	Et	Ph	н	н	MeO	н	Me	Me	Me	H
	н	TMS-CH ₂	н	Cl	Н	н	Et	Me	Н	H
40	н	TMS-CH2	Н	Me	H	н	H	F	н	H
•••	н	TMS-CH2	н	Me	Me	н	H	Н	Br	Н
	Me	TMS-CH ₂	н	Cl ,	H	2-C1	Н	MeO	H	H
	Et.	TMS-CH ₂	н	н	MeO	н	Мe	H	MeO	н

			R ³ 1	s Me				R ³ is	Me; R ⁴	and R ¹⁸	together
									forms - (C	CH ₂) ₃ -	
5	B1	B ⁴	B18	B ⁵	R 6	R ⁷		R1	R ⁵	R6	R ⁷
	H	Ме	Cl	Me	Me	Н		Et	Cl	н	н
	н	Ме	Br	Cı	H ·	н		н	н	CI	Н
10	н	Me	Cl	Cl	H	H		н	н	cr ₃	н
	Me	Me	Br	F	н	H		H	Н	F	H
	Et	Me	Cl	CF3	H	H		Me	н	Cl	H
											•
15			R ³ is	Me;	R ⁴ and	d R ¹⁸	tog	ether f	orma - (CH		
	\mathbb{R}^1	R ⁵	B 6	B	7	•		B1	R ⁵	R6	B ⁷
	н	Cl	H	H				Me	EtO	H	Н
20	н	Me	Н	н				Et	H	EtO	н
	н	Et	н -	н				н	н	Cl	H
	Me	i-Pr	н	н				н	Н	CF ₃	Н
0.5	Et	н	Me	н				н	H	F	н
25	н	Cl	н	2	C1			н	MeO	MeO	H
	H	ме	Me	н				Me	MeO	Н	2-MeO
	н	Et	Et	H				Et	F	H	н
30	Me	Me	Me	н				н	CF3	Н	н
	Et	Me	н	н				н	CF3CH2O	H	H
	н	MeO	н	H				н	HCF ₂ O	н	H
35	н	H	MeO	н				Me	H	Cl	н

TABLE 21

5	6 R4 5 5 5 p3
10	8 A R
15	N R ⁵
20	$6 \underbrace{\frac{1}{1} \frac{1}{4}}_{5} R^{7}$

			R ⁷ is H; R ³	is Me; R4	is 6-Me	
25	R ¹	R ⁵	₿ ⁶	R ¹	B ⁵	\mathbb{R}^6
23	н	н	н	н	н	4-F
	н	F	н	н	F	4-F
	н	C1	H	н	C1	4-F
30	н	Me	н	н	Me	4-F
	н	с г 3сн ₂ о	H	H	CF3CH2O	4-F
	н	CF3	н	н	CF3	4-F
35	Н	MeO	н	н	MeO	4-F
	н	н	4-C1	Me	Н	H
	Ме	F	5-F	Me	F	н
	Me .	C1	5-C1	Me	Cl	н
40	Me .	Me	4-F	Me .	Me	н
	Ме	CF3CH2O	4-F	Me	CF3CH2O	н
	Me	CF ₃	4-F	Me	CF ₃	H
45	Me	MeO	4-F	Me	MeO	H
	н	н	3-CF3	Et	н	H
	н	F	6-F	Et	F	H
50	н	Cl	6-C1	Et	Cl	• н
••	н	Me	6-Me	Et	Me	H

-			1	R ⁷ is H; R	3	is Me; R	4 i	з 6-Ме		
	R1	B ⁵	\mathbb{R}^6			B1	B.	5	\mathbb{R}^6	
5	н	CF3CH2O	6-Me	•		Et	CI	г ₃ сн ₂ о	Н	
	н	CF ₃	6-Me	=	1	Et	CI	З	H	
	н	MeO	6-Me	* O		Et	M	: O	Н	
10	н	н	4-B	:	L	<u>i-Pr</u>	H		H.	
	Me	F	6-F			1-Pr	F		H	
	Me	Cl	6-C	L		i-Pr	C:	L .	H	
	Me	Me	6-M	3		<u>i</u> -Pr	M	3	H	
15	n-Pr	CF3CH2O	н		1	<u>i</u> -Pr	C	г ₃ сн ₂ о	H	
	<u>t</u> −Bu	CF ₃	H			<u>i-Pr</u>	CI	⁷ 3	Н	
	sec-Bu	MeO	H			<u>i</u> -Pr	M	≥ O	H	
20	н	HCF ₂ O	H			H	H	CF ₂ O	6~H	CF ₂ O
	н	Br	H			H	1		H	
	Н	<u>t</u> -BuO	Н			Н	E	:0	H	
25	н	н	4-N	^{1e} 2		Ме	H			Et ₂
	Н	н	4-pi	iperidino		Me	H		4-p	yrolidino
					-	,				
		_		R ⁷ is H;	R3		R*			-6
30	B_1	R 5		R ⁶		R ¹		R ⁵		R ⁶
	Н	Н		н		H		Н		4-F
	н	F		Н		H		F Cl		4-F 4-F
35	H	Cl		H		H		Me		4-F
	Н	Me		H		Н				
	н	CF3CH2	0	Н		H		CF3CH2O		4-F
40	н	CF3		H		H		CF ₃ MeO		4-F
-	Н	MeO		H		Н		н		4-F
	Н	H		4-Cl		Me		n F		H
	Me	F		5-F		Me		C1		H
45	Me	Cl		5-C1	1	Me				H
	Me	Me		4-F	1	Me		Ме		H
	Me	Cr ₃ CH ₂	0	4-F		Me		CF ₃ CH ₂ O		Н
50	Me	CF3		4-F	-	Me		CF ₃	•	Н
	Me	MeO		4-F	1	Me		MeO		H

			R ⁷ is H; R ³	is Me; I	4 is H	
•	R ¹	R ⁵	R ⁶	R ¹	B ⁵	R 6
5	н	н	3-CF3	Et	н	H
	н	F	6-F	Et	F	н
	н	Cl	6-C1	Et	Cl	H
10	H	Me	6-Me	Et	Ме	H
	H	CF3CH2O	6-Me	Et	cr3cH20	H
	н	CF3	6-Me	Et	CF3	H
15	н	MeO	6-Me0	Et	MeO	H
,5	H	н	4-Br	<u>i</u> -Pr	Н	Н
	Me	F	6-F ·	<u>i</u> -Pr	r	н
	Me	Cl	6-CI	<u>i</u> -Pr	Cl	H
20	Me	Me	6-Me	<u>i</u> -Pr	Me	H
	n-Pr	ст ₃ сн ₂ о	н	<u>i</u> -Pr	CF3CH2O	Н
	<u>t</u> -Bu	CF ₃	н	<u>i</u> -Pr	CF ₃	H
25	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	Н
	н	NO ₂	6-C1	Me	CN	6-CN
	H	Br	6-Br	Me	MeS (0) 2	4-F
.	Н	HCF ₂ O	4-Me0	Me	<u>i</u> -Pr	H
30						
			R ⁷ is H; R			
	R1	B ⁵	B ⁶ ⋅ ∘	R1	R ⁵	B6
35	H	н	H	Н	Н	4-F
	Н	F	н	Н	F	4-F
	н	Cl	н	н	Cl	4-F
40	Н	Me	н	Н	Me	4-F
	н	CF3CH2O	н	Н	CF3CH2O	4-F
	н	CF3	н	н	CF3	4-F
	н	MeO	н	H	MeO	4-F
45	H	H	4-C1	Me	H	H
	Н	F	5- F	Me	F	H
	н	Cl	5-C1	Me	Cl	Н
50	H	Me	4-F	Me	Me	H.

			R^7 is H; R^3	1s H; R	is H	
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	R ⁶
5	Me	CF3CH2O	4-F	Me	CF ₃ CH ₂ O	H
	Me	CF3	4-F	Me	CF ₃	H
	Me	MeO	4-F	Me	MeO	H
	н	н	3-CF3	Et	H	н
10	н	F	6-F	Et	F	H
	н	C1	6-C1	Et	Cl	Н
	н	Ме	6-Me	Et	Me	H
15	н.	CF3CH2O	6-Me	Et	CF3CH2O	н
	Me	CF3	6-Me	Et	CF ₃	H
	Me	MeO	6-MeO	Et	MeO	H
20	н	н	4-Br	<u>i</u> -Pr	н	н
20	Н	F	6-F	<u>i-Pr</u>	F	Н
	н	Cl	6-C1	<u>i</u> -Pr	Cl	H
	н	Ме	6-Me	<u>i</u> -Pr	Me	н
25	n-Pr	CF3CH2O	н	<u>i</u> -Pr	CF ₃ CH ₂ O	н
	<u>t</u> -Bu	CF3	н	<u>i</u> -Pr	CF3	Н
	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	H .
30	Me	<u>t</u> -Bu	4-MeO	H	TMS	6-Me
	Me	i-Pro	н	Н	TMS	4-F
	Me	CF3CF2CF2	н	н	TMS	5-CF3
			1			
35	R ¹ i	s H; R ³ is Et		R	, R ³ is Et	
	R ⁵	R ⁶	R ⁷	R ⁵	R6	R ⁷
	H	4-C1	5-Cl	Cl	4-Cl	6-C1
40	H	4-F	6- <u>sec</u> -Bu	Cl	4-C1	6-MeO
	н	4-Et	5-1	Cl	3-Me	4-C1
	H	3-F	6-CF ₃ CH ₂ O.	Cl	3-CF3	5-CF3
45	н	4-Me	6-CF ₃ CF ₂	Cl	4-MeO	5- <u>t</u> -BuO
.•	Н	4-Br	6- <u>n</u> -BuO	Cl	3- <u>n</u> -Bu	4-Me

	R ¹ is H;	R ³ is Et	; R ⁴ is H			R ⁴ is H
	B ⁵	B ⁶	R ⁷	R ⁵	r _e	R ⁷
5	Me	4-Me	6-Me	TMS	H	H
	Ме	4-F	6-Me	TMS	H	4-F
	Me	4-1-Bu	6- <u>t</u> -Bu	TMS	н	6-Me
40	Me	4-CF3	6-C1	TMS	H	6-MeO
10	Me	3-Me	5-Br	TMS	н	6-C1
	Me	5- <u>1</u> -Pr	6-MeO	TMS	H	6-HCF ₂ O
	<u>t</u> -Bu	6- <u>t</u> -Bu	н	Br	6-Br	H
15	<u>t</u> -Bu	4- <u>t</u> -BuO	н	NMe ₂	H	H
	<u>t</u> -Bu	Н	н	CONHET	н	H
	CF3 (CH2) 30	н	н	CN	H	H
20	$CF_3(CF_2)_2$	н	н	4-F-Ph	H	H
20	(CF ₃) ₂ CH	н	н	2-MePh	н	н
	sec-BuS	H	н	NO_2	6-Me	H
	MeS	6-MeS	н	4-Me-PhO	H	H
25	EtS	4-F	н	PhS	H	H
	MeS(O)	н	н	со2н	3-MeO	H
	1-Prs(0)	н	н	CO ₂ H	Н	H
30	<u>t</u> -BuS (0) 2	Н	н	HC≕C	н	H
	MeS (0) 2	н	н	MeC≖C	H	H
	CH ₂ =CH	Н	н	MeC=CCH ₂ O	4-F	Н
35	$CH_2=C(CH_3)CH_2$	Н	н	<u>t</u> -BuO	Н	H
33	CH2=CHCH2O	H	н	n-PrO	н	Н
	меосн ₂ сн ₂	н	н	EtO	5-EtO	H
	MeO ₂ C	н	н	Ac	н	Н
40	MeOCH ₂ O	Н	н	sec-BuCO	H	н

TABLE 22

 R^1 , R^2 and R^4 are H; R^3 is Me 20 1-naphthalenyl 2-furanyl 25 2-naphthalenyl 3-thienyl 2,5-dimethyl-3-furanyl 2,5-dimethyl-3-thienyl 30 4-methylphenoxy 2-chlorophenoxy 2,6-dimethylphenoxy 3-methylphenylthio 35 phenylamino benzyl Et 40 sec-Bu c-propyl cis-2-methylcycloheptyl

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GIS-2-methylcyclone

SEC-butylthio

CF3CH2O

5-methyl-2-thienyl

5-methyl-2-pyridyl

 \mathbb{R}^1 and \mathbb{R}^2 are H; \mathbb{R}^3 is Me; \mathbb{R}^4 is 6-Me 1-naphthalenyl 2-furanyl 2-naphthalenyl 3-thienyl 2,5-dimethyl-3-furanyl 2,5-dimethyl-3-thlenyl 4-methylphenoxy 2-chlorophenoxy 2,6-dimethylphenoxy 4-cyanophenylthio 4-methylphenylamino Cl n-hex Ме c-hexyl $CF_3CH_2CH_2$ n-butoxy C1 (CH₂) 50 4-methyl-3-furanyl

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2-methyl-3-pyridyl

```
R^1 and R^2 are H; R^3 is Me;
         R^1, R^2 and R^4 are H;
                                                      R<sup>4</sup> is 6-Me
         R^3 is Me
                                                      2-indanyl
         2-indanyl
                                                      2-tetrahydronaphthalenyl
         2-tetrahydronaphthalenyl
10
                                                      R^1 and R^3 are Me; R^2 and R^4
         R^1, R^2, R^3 and R^4 are H
                                                      are H;
                                                      E
15
                                                      1-naphthalenyl
         1-naphthalenyl
         2-furanyl
                                                      2-furanyl
                                                      3-thienyl
         3-thienyl
                                                      3-pyridyl
         3-pyridyl
20
                                                                 \mathbb{R}^3 is Et; \mathbb{R}^4 is H
                  \mathbb{R}^3 is Me; \mathbb{R}^4 is H
                                                             \mathbb{R}^2
                  \mathbb{R}^2
                                                      \mathbb{R}^1
         \mathbf{R}^{\mathbf{1}}
                                E
25
                                                      Н
                                                             5-Et
                                                                              Ph
                               Ph
                  5-Me
                  5-1-Pr
                                2-Me-Ph
                                                             5-<u>sec</u>-Bu
                                                                              2-Me-Ph
                  5-<u>n</u>-Bu
                                2-C1-Ph
                                                             5-CF3 (CF2) 3 2-C1-Ph
30
                  5-CN
                                2-MeO-Ph
                                                             5-<u>t</u>-Bu
                                                                              2-MeO-Ph
                  5-CF3
                                CF3CH2O-Ph
                                                             5-FCH<sub>2</sub>
                                                                              2-CF3CH2O-Ph
                                                                              1-naphthalenyl
                  5-CF3CH2
                                1-naphthalenyl
                                                             5-n-Pr
                  5-Me
                                Ph
                                                             4-Me
                                                                             Ph
         <u>i</u>-Pr
                                                     Me
35
                                2-Me-Ph
                                                             4-Me
                                                                             2-Me-Ph
        i-Pr
                  5-Me
                                                     Me
                                2-C1-Ph
                                                             4-Me
                                                                             2-C1-Ph
        i-Pr
                  5-Me
                                                     Mo
                                2-MeO-Ph
        i-Pr
                  5-Me
                                                     Me
                                                             4-Me
                                                                             2-MeO-Ph
```

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	R ³ is h	ie; R ⁴ is H	
	R ¹	R ²	E
5	<u>i</u> -Pr	5-Me	2-CF3CH2O-Ph
	Cl	н	Ph
	F	н	2-Me-Ph
	CF3CF2	н	2-C1-Ph
10	CH2-CHCH2	H	2-MeO-Ph
	CO ₂ Me	н	2-CF3CH2O-Ph
	2-Me-Ph	H	Ме
15	Bzl	H	Ph
	2-naphthalenyl	н	n-Bu
	3-thienyl	н	CF3CF2
20	3-pyridyl	H	Ме
20	CN	5-Me	Ph
	t-Bu	5-Me	2-Me-Ph
	ClCH ₂	5-Me	2-C1-Ph
25	Et	5-Me	2-MeO-Ph
	n-Pr	5-Me	2-CF3CH2O-Ph
	Me .	4-Me	2-CF3-Ph
30	<u>i-Pr</u>	4-Me	2-CF3-Ph
	CF ₃	4-CF ₃	2-CF3-Ph
	Me	4-Me	2-TMS-Ph
	H	5-ОН	Ph
35	н	5-MeO	4-Me-Ph

H

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5-OC (O) Me

5-0C (O) NHMe

4-C1-Ph

Ph

	R ³ is	Me; R ⁴ is	Me
	R ¹	R ²	E
5	i-Pr	5-Me	2-C1-Ph
	<u>i</u> -Pr	5-Me	2-MeO-Ph
	i-Pr	6-Me	2-CF3CH2O-Ph
10	Cl	н	Ph
	r	н	4-Me-Ph
	CF3CF2	н	4-C1-Ph
Ω	CH2-CHCH2	H	4-MeO-Ph
15			
	R ³ is	Me; R ⁴ i	s H
	R ¹	B ²	E
20	CO ₂ Me	н	2-CF3CH2O-Ph
	2-Me-Ph	Н	Me
	Bzl	н	Ph
25	2-naphthalenyl	н	n-Bu
20	3-thienyl	Н	CF3CF2
	3-pyridyl	Н	Me
	CN	5-Me	Ph
30	<u>t</u> -Bu	5-Me	2-Me-Ph
	C1CH ₂	5- M e	2-C1-Ph
	Et	5-Me	2-MeO-Ph
35	n-Pr	6-Me	2-CF3CH2O-Ph
	Me	4-Me	2-CF ₃ -Ph
	i-Pr	4-Me	2-CF ₃ -Ph
40	CF ₃	4-CF ₃	2-CF ₃ -Ph

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	R^3 is	Et; R ⁴ 1	s H
	R ¹	R ²	E
	Ме	4-Me	2-TMS-Ph
5	Ме	4-Me	2-C1-Ph
	Me	4-Me	2-MeO-Ph
	Me	4-Me	2-CF ₃ CH ₂ O-Ph
10	Br	н	Ph
	CN	н	4-Me-Ph
	Ac	н	4-C1-Ph
	CH ₃ C≔CCH ₂	н	4-MeO-Ph
15			
	R ^{3.} is 4	-Me; R ⁴	is Me
	R ¹	B ²	E
20	co ₂ Et	н	2-CF3CH2O-Ph
	4-Cl-Ph	н	Ph
	5-Me-3-furyl	Н	<u>i</u> -Pr
25	EtCO	Н	2-C1-Ph
	2-furyl	4-Me	CF ₃
,	Ph	5-Me	Me
	CN	4-Me	Ph
30	<u>t</u> -Bu	4-Me	2-Me-Ph
	FCH ₂	4-Me	2-C1-Ph
	Et	4-Me	2-MeO-Ph
35	C1 (CH ₂) ₄	4-Me	2-CF3CH2O-Ph
	Me	4-Me	2-CF ₃ -Ph
	1-Pr	5-CN	2-CF ₃ -Ph
	CF ₃	5-Me	2-CF3-Ph

<u>i-Pr</u>

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2-TMS-Ph

4-Me

TABLE 23

5			- A	3			
				5 4 R ⁴			
			8	Y K			
10			N	N.			
			Ĭ				
			√ N	N E			
15							
			, R ¹		$\frac{3}{R}$ 6		
				6 V	4		
20				5	` _R 7		
		•					
			R ⁷ is H; I	1			
25	R^1	B ⁵	₿ ⁶	R ¹	B ⁵	R ⁶	
	н	H	н	н	н	4-F	
	н	F	н	Н	F	4-F	
	н	Cl	н	н	Cl	4-F	
30	н	Me	н	н	Me	4-F	
	н	CF3CH2O	н	н	CF3CH2O	4-F	
	H	CF ₃	н	н	CF ₃	4-F	
35	н	MeO	н	H	MeO	4-F	
	н	н	4C1	Me	H	H	
	Me	F	5-F	Me	F	H	
40	Me	Cl	5-C1	Ме	Cl	H	
40	Ме	Me	4-F	Me	Me	H	
	Me	CF3CH2O	4-F	Me	CF ₃ CH ₂ O	н	
	Me	CF a	4-F	Me	CF3	H	

4-F

6-F

6-C1

6-Me

3-CF3

Мө

Et

Et

Et

Et

MeO

н

Cl

Me

Н

H

H

H

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Me

H

H

Н

Ħ.

F

Me .

			R ⁷ is H; R ²	3 is H; R4	is Me	
	R1	R ⁵	R ⁶	R ¹	B ⁵	R ⁶
5	H.	CF3CH2O	6-Me	Et	CF3CH2O	H
	н	CF ₃	6-Me	Et	CF ₃	H
	н	MeO	6-MeO	Et	MeO	H
	н	Н	4-Br	i-Pr	н	Н
10	Me	F	6-F	1-Pr	r	н
	Me	Cl	6-C1	i-Pr	Cl	н
	Me	Ме	6-Me	i-Pr	Me	н
15 ·	n-Pr	CF3CH2O	н	j-Pr	сғ ₃ сн ₂ о	н
	<u>t</u> -Bu	CF ₃	н	1-Pr	CF ₃	н
	sec-Bu	MeO	н	<u>i</u> -Pr	MeO	н
	н	HCF ₂ O	н	н	HCF ₂ O	6-HCF ₂ O
20	н	Br	н	н	ı	н
	н	t-BuO	н	н	EtO	н

TABLE 24

5 10 15			R ¹⁰ 5 4 1 R ⁹		R ⁴	
			R ³ is H; P	t ⁴ is Me; 1		
25	E	R ⁸	R ⁹	E	B ⁸	R9
	H	H	Н	н	н	4-F
	Н	F ·	н	Н	F	4-F
	н	Cl	н	н	Cl	4-F
30	Н	Me	Н	Н	Me	4-F
	н	CF3CH20	Н	н	CF3CH2O	4-F
	Н	CF ₃	н	н	CF3	4-F
35	H	MeO	Н	н	MeO	4-F
	H	H	4-C1	Me	н	H
	Me	F	5-F	Me	F'	H
40	Me	Cl	5-Cl	Me	Cl	H
40	Me	Me	4-F	Ме	Ме	H
	Me	CF3CH2O	4-F	Me	CF ₃ CH ₂ O	H
	Me	CF ₃	4-F	Me	CF ₃	H

4-F

6-F

6-C1

6-Me

3-CF3

MeO

н

F

Cl

Me

Me

Et

Et

Et

Et

MeO

H

F

Cl

Me

н

H

H

. н

н

55

45

Me

H

H

			P	3 is H; R4	is Me;	R10 i	н в		
	E	R ⁸	R ⁹		E	B8		R9	
_	н	CF ₃ CH ₂ O	6-Me		Et	CF3	3CH2O	H	
5	н	CF3	6-Me		Et	CF:	3	H	
	н	MeO	6-Me	ю.	Et	Me)	H	
	н	н	4~Bz		1-Pr	H		H	
10	Me	F	6 -F		1-Pr	F		H	
	Me	Cl	6-C1	L	<u>i</u> -Pr	Cl		H	
	Me	Ме	6-Me	•	i-Pr	Me		H	
15	n-Pr	CF3CH2O	н		1-Pr		3CH2O	H	
	<u>t</u> -Bu	CF ₃	H		<u>i</u> -Pr		3	H	
	sec-Bu	MeO	н		i-Pr			H .	
	Ph	HCF ₂ O	н		н	HC	F ₂ O		CF ₂ O
20	н	Br	H		Ph	I		H	
	Н	<u>t</u> -BuO	Н		н	Etc	0	H	
						- ^			
25				R ⁴ is Et;	1				_ 0
	E	R ⁸ .		R ⁹	E		R ⁸		R ⁹
	н	н		Н	н		Н		4-F
30	Н	F		Н	н		F		4-F 4-F
	Н	Cl		Н	н		C1		4-F
	Н	Me		Н	H.		Me		
	Н	CF3CH2O)	Н	н		CF3CH2O		4-F
35	H	CF ₃		H	н		CF ₃		4-F
	н	MeO		н	н		MeO 		4-F
	н	н		4-C1	Me		H		Н
40	Me	F		5-F	Me		F		Н
	Me	Cl		5-C1	Me		C1		H
	Me	Me		4-F	Me		Ме		Н
45	Me	CF3CH2O	•	4-F	Me		CF ₃ CH ₂ O		Ħ
40	Me	CF ₃		4-F	Me		CF ₃		Н
	Me	MeO		4-F	Me		MeO		Н

				R4	is	Et;	R3	and R^{10}	are H	
	E	R ⁸	R9				1	E	R ⁸	R ⁹
5	н	н	3-C	Fą				Et	н	Н
	н	r	6-F	_				Et	F	H
	н	cı	6-C					Et	Cl	н .
10		Me	6-M				1	Et	Me	н
	н	CF3CH2O	6-M					Et	CF3CH2O	н
	н	CF ₃	6-M					Et	cr ₃	н
	н	MeO	6-M					Et	MeO	H
15	н	R	4-B					i-Pr	н	н
,,	H	F	6-F					i-Pr	F	н
	Me	C1	6-0				1	i-Pr	Cl	н
	Me		6-M				-	i-Pr	Me	н
20	Me	Me ·	н				1	i-Pr	CF3CH2O	н
	n-Pr	CF3CH2O	н					i-Pr	CF ₃	н
	t-Bu	CF ₃						i-Pr	MeO	н
^	sec-Bu	MeO	H							6-HCF ₂ O
25	Ph	HCF ₂ O	4-M	ie0				H	HCF ₂ O	_
	н	Br ·	H				1	Ph	I	Н
	н	<u>t</u> -BuO	H					H	EtO	Н

TABLE 25

5	R ³
0	n n n
15	R ² N N

20		R ³ 1s H;	R ⁴ is Et		R ³ is H	; R ⁴ is Me
	R ¹	R ²	E	R1	R ²	E
	н	Me	Ph	н	Et	Ph
25	н	<u>i</u> -Pr	2-Me-Ph	H	sec-Bu	2-Me-Ph
	н	n-Bu	2-C1-Ph	н	$CF_3(CF_2)_3$	2-C1-Ph
	н	CN	2-MeO-Ph	H	<u>t</u> -Bu	2-MeO-Ph
30	н	CF ₃	CF3CH2O-Ph	Н	FCH ₂	2-CF3CH2O-Ph
	н	CF3CH2	1-naphthalenyl	H	n-Pr	1-naphthalenyl
	<u>i-Pr</u>	Me	Ph .	Me	Ме	Ph
	1-Pr	Me	2-Me-Ph	Me	Ме	2-Me-Ph
35	<u>i</u> -Pr	Me	2-Cl-Ph	Me	Me	2-Cl-Ph
	i-Pr	Me	2-MeO-Ph	Me	Me	2-MeO-Ph
	1-Pr	Me	2-CF3CH2O-Ph	Me	Me	2-CF3CH2O-Ph
40	Cl	н	Ph	Br	н	Ph
	F	н	2-Me-Ph	CN	R	2-Me-Ph
	CF3CF2	H	2-C1-Ph	Ac	н	2-C1-Ph

	R ³ is H; R ⁴ is	Et		R ³ is	H; R4	is Me
5	R ¹	R ²	E	R ¹	R ²	E
	CH2=CHCH2	н	2-MeO-Ph	сн ₃ с=ссн ₂	н	2-MeO-Ph
	CO ₂ Me	H	2-С Г 3СН ₂ О-Рh	CO2Et	н	2-CF3CH2O-Ph
10	2-Me-Ph	н	Me	4-C1-Ph	H	Ph
	Bzl	H	Ph	5-Me-3-furyl	н	Ph
	2-naphthalenyl	н	n-Bu	EtCO	н	i-Pr
	3-thienyl	H	CF3CF2	2-furyl	H	2-C1-Ph
15	3-pyridyl	H	Me	Ph	Me	cr ₃
	Ph	ме	н	Ph	Me	н
	2-Me-Ph	Me	н	2-Me-Ph	Me	н
20	2-C1-Ph	Me	н	2-Cl-Ph	Me	н
20	2-MeO-Ph	Me	н	2-MeO-Ph	Me	н
	2-CF3CH2O-Ph	Me	н	2-CF3CH2O-Ph	Me	н
	Ph	Me	n-Pr	Ph	i-Pr	Me
25	Ph	Me	CF3	Ph	CF3	Me
	Ph	Me	<u>i</u> -Pr	Ph	Et	Me
	. bp	Me	sec-Bu	Ph	<u>n</u> -Bu	Me

.

TABLE 26

5	R ⁴
10	N N N
15	$ \begin{array}{c c} R^2 & & & & \\ \hline & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & $

20

			R^2 , R^4 and R^7 are H; R^3 is Me				
	R1	ß ⁵	R 6	R ¹	R ⁵	R6	
25	н	н	H	Ме	4-Me	н	
20	н	4-NMe ₂	H	Me	4-Et	H	
	н	4-Me	H	Me	4- <u>i</u> -Pr	Н	
	н	4-Et	H	Me	4-Cl	Н	
30	н	4- <u>n</u> -Pr	н	Me	4-MeO	н	
	н	4- <u>1</u> -Pr	н	Me	4-EtO	Н	
	Н	4-n-Bu	н	Ме	4-CF ₃	H	
35	Н	4- <u>sec</u> -Bu	н	Et	н	Н	
	н	4- <u>i</u> -Bu	H	H	3-NMe ₂	Н	
	н	4- <u>t</u> -Bu	H	н	3-Me	н	
	н	4-C1	н	н	3-Et	Ħ	
40	н	4-Br	н	н	3-n-Pr	H	
	н	4-F	H	н	3-1-Pr	н	
	н	4-OH	н	н	3- <u>n</u> -Bu	н	
45	Н	4-MeO	н	н	3-C1	н	
	н	4-EtO	н	н	3-Br	н	
	н	4-CF3	н	н	3-F	н.	
50	н	4-CF3CH2O	н	н	3-ОН	H	
50	Me	H	н	н	3-MeO	H	

		1	R^2 , R^4 and R^7	are H; I	R ³ is Me	
	R ¹	R ⁵	R6	R ¹	R ⁵ .	B ⁶ .
5	Н	3-EtO	H	н	3-Me	4-Me
	н	3-CF3	н	н	2-Et	4-Et
	н	3-CF3CH2O	н	н	2-Et	5-Et
	 Me	3-Me	н	н	3-Et	4-Et
10	Me	3-Et	н	н	2-Me	5- L- Bu
	Me	3- <u>1</u> -Pr	н	н	2-C1	4-C1
	Me	3-C1	н	н	2-C1	5-C1
15	Me	3-MeO	н	Et	3-MeO	н
	Me	3-EtO	н .	Et	3-EtO	H
	Me	3-CF3	н	Et	3-CF3	H
20	Et	3-Me	н	Me	2-Me	4-Me
	Et	3-Et	н	Me	2-Me	5-Me
	Et	3- <u>1</u> -Pr	н	Ме	3-Me	4-Me
	Et	3-C1	н	Me	2-Et	4-Et
25	Et	4-Me	н	Me	2-Et	5-Et
	Et	4-Et	н	Me	3-Et	4-Et
	Et	4-1-Pr	н	Me	2-Me	5- <u>t</u> -Bu
30	Et	4-C1	н	Et	2-Me	4-Me
	Et	4-Me0	н	Et	2-Me	5-Me
	Et	4-EtO	н	Et	3-Me	4-Me
	Et	4-CF3	н	Et	2-Et	4-Et
35	н	2-Me	н	Et	2-Et	5-Et
	н	2-Et	н	Et	3-Et	4-Et
	н	2-C1	н	н	4-Ph	Н
40	н	2-F	н	H	4-PhO	н
	н	2-OH	н	н	4- <u>c</u> -Hex	н
	Me	2-Me	н	н	4-Hex	н
45	Me	2-C1	н	н	4-p-Amyl	H
	Me	2-F	H	Me	4-Ph	н
	Et	2-Me	н	Me	4-PhO	H
	Et	2-C1	н	Me	4-g-Hex	H.
50	Et	2- F	н	Me	4-Hex	н
	н	2-Me	4-Me	Me	4- <u>n</u> -Amyl	н
	н	2-Me	5-Me	Me	4-Ph	H

			R ² , R ⁴ and R ⁷	are H;	R ³ is Me	
	R1	В ⁵ .	R6	R ¹	B ⁵	₽ ⁶
5	Me	4-PhO	н	Et	3-NMe ₂	TH .
	Me	4-c-Hex	н	н	3-NH ₂	H
	Me	4-n-Amyl	H.	н	4-NH ₂	H
10	Me	3-C1	4-C1	Me	3-NH ₂	H
10	Me	2-C1	4-C1	Me	4-NH ₂	H
	Me	2-C1	5-C1	Et	3-NH ₂	H
	Me	3-C1	4-C1	Et	4-NH ₂	Н
15	Et	2-C1	4-C1	n-Pr	4-NMe ₂	H
	Et	2-C1	5-C1	n-Pr	4-Me	Н
	Et	3-C1	4-C1	n-Pr	4-Et	H
20	H	2-Me0	4-MeO	n-Pr	4-n-Pr	н
	H	3-Me0	5-MeO	n-Pr	4-C1	H
	н	3-MeO	4-MeO	n-Pr	4-F	н
25	Me	2-MeO	4-MeO	n-Pr	4-Br	Н
	Me	3-Me0	5-MeO	n-Pr	4-MeO	Н
	Me	3-MeO	4-MeO	n-Pr	4-EtO	н
	Et	2 - MeO	4-MeO	n-Pr	4-CF3	Н
30	Et	3-MeO	5-MeO	n-Pr	4-CF3CH2O	H
	Et	3-MeO	4-MeO	n-Pr	3-NMe ₂	H
	H	3-Br	5-Br	n-Pr	3-ме	н
35	Me	3-Br	5-Br	n-Pr	3-Et	H
	Et	3-Br	5-Br	n-Pr	3- <u>n</u> -Pr	H
	н	3-Me	5-Me	n-Pr	3-C1	Н
	Me	3-Me	5-Me	D-br	3-F	н
40	Et	3-Me	5- Me	n-Pr	3-Br	Н
	H	3-C1	4-MeO	n-Pr	3-MeO	Н
	Me	3-C1	4-MeO	n-Pr	3-EtO	Н
45	Et	3-C1	4-MeO	n-Pr	3-CF ₃	H
	Me	4-NMe2	н	n-Pr	3-CF3CH2O	Н
	Me	3-11Me ₂	н	n-Pr	3-Me	4-Me
	Et	4-NMe2	н	n-Pr	3-Me	5-Me

	R^2 , R^4 and R^7 are H; R^3 is Me										
	. R ¹ -	R ⁵	R6	R1	R ⁵	R6					
5	n-Pr	3-C1	4-C1	<u>i</u> -Pr	4-C1 -	н					
	n-Pr	3-MeO	4-MeO	i-Pr	4-F	H					
	n-Pr	3-MeO	5-MeO	1-Pr	4-Br	H					
40	n-Pr	н	н	1-Pr	4-Me0	H					
10	n-Bu	н	н	i-Pr	4-EtO	H					
	n-Bu	4-Me	н	<u>i</u> -Pr	4-CF3	H					
	n-Bu	4-Et	н	<u>i</u> -Pr	4-CF3CH2O	н					
15	n-Bu	4-n-Pr	н	<u>i</u> -Pr	3-Me	4-Me					
	n-Bu	4-1-Pr	н .	<u>i</u> -Pr	3-Me	5-Me					
	n-Bu	4-C1	н	<u>i</u> -Pr	3-C1	4-C1					
20	n-Bu	4-F	н	<u>i</u> -Pr	3-MeO	4-MeO					
	n-Bu	4-Br	н	<u>i</u> -Pr	3-MeO	5-MeO					
	n-Bu	4-Me0	н	н	4-TMS	H					
	n-Bu	4-Et0	н	н	4-I	H					
25	n-Bu	4-CF3	н	H	4- <u>t</u> -BuO	H					
	n-Bu	4-CF3CH20	н	н	4-CF3 (CH2) 30	н					
	n-Bu	3-Me	н	н	4-CF3 (CF2) 2	H					
30	n-Bu	3-Et	н	н	4-(CF ₃) ₂ CH	H					
	n-Bu	3-n-Pr	н	н	4-CH3CHC1CH	H					
	n-Bu	3-C1	н	Me	4-TMS	н					
0.5	n-Bu	3-F	н	Me	4-1	н					
3 5	n-Bu	3-MeO	н	Me	4- <u>t</u> -BuO	H					
	n-Bu	3-EtO	н	Me	4-CF3 (CH2) 30	H					
	n-Bu	3-CF3	н	н	4-MeS	H					
40	n-Bu	3-CF3CH2O	н	н	4-EtS	H					
	1-Pr	н	н	н	4-MeS (O)	н					
	<u>i</u> -Pr	4-Me	н	н	4-1-Prs (O)	н					
45	<u>i</u> -Pr	4-Et	н	н	4-MeS (O) 2	H					
	i-Pr	4- <u>n</u> -Pr	н	H	4-CH ₂ -CH	н					
	<u>i</u> -Pr	4-1-Pr	н	H	4-CH ₂ -C (CH ₃) CH ₂	H					

	R^2 , R^4 and R^7 are H, R^3 is Et							
	R ¹	R ⁵	R ⁶	R ¹	R ⁵	\mathbb{R}^6		
5	н	4-CH2-CHCH2O	н	H	3-Me	-H		
	н	4-MeOCH ₂ CH ₂	н	н	3-Et	H		
	н	4-MeOCH ₂ O	н	н	3-n-Pr	H		
	н	н	н	н	3- <u>1</u> -Pr	н		
10	н	4-NMe ₂	н	H	3- <u>n</u> -Bu	H		
	н	4-Me	н	H	3-C1	H		
	н	4-Et	н	н	3-Br	H		
15	н	4-n-Pr	н	H	3-F	H		
	н	4- <u>i</u> -Pr	н	H	3-ОН	H		
	н	4-n-Bu	Н	H	3-MeO	H		
	н	4- <u>sec</u> -Bu	H	H	3-EtO	H		
20	н	4- <u>i</u> -Bu	н .	. H	3-CF3	H		
	н	4- <u>1</u> -Bu	н	н	3-CF ₃ CH ₂ O	Н		
	Ħ	4-C1	н	Me	3-Me	H		
25	н	4-Br	н	Me	3-Et	H		
	н	4-F	н	Me	3- <u>1</u> -Pr	H		
	H	4-OH	н	Me	3-C1	H		
30	н	4-Me0	н	Me	3-MeO	H		
	н	4-EtO	н	Me	3-EtO	H		
	H	4-CF3	н	Me	3-CF ₃	H		
	H	4-CF3CH2O	н	Et	3-Me	H		
35	Me	н	н	Et	3-Et	H		
	Me	4-Me	н	Et	3- <u>1</u> -Pr	Н		
	Me	4-Et	н	Et	3-C1	H		
40	Me	4- <u>i</u> -Pr	н	Et	4-Me	Н		
	Me	4-C1	н	Et	4-Et	H		
	Me	4-Me0	н	Et	4- <u>1</u> -Pr	H		
45	Me	4-EtO	н	Et	4-Cl	H		
45	Me	4-CF ₃	н	Et	4-MeO	H		
	Et	н	н	Et	4-Eto	H		
	н	3-NMe ₂	н	Et	4-CF3	н.		

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}

			R^2 , R^4 and R^7 are H, R^3 is Et					
	R1	R ⁵	R ⁶	R1	R ⁵	R ⁶		
5	н	2-Me	н	Et.	3-Me	4-Me .		
5	н	2-Et	н	Et	2-Et	4-Et		
	н	2-C1	н	Et	2-Et	5-Et		
	н	2-F	н	Et	3-Et	4-Et		
10	н	2-OH	н	H	4-Ph	н		
	Me	2-Me	н	H	4-PhO	H.		
	Me	2-C1	н	н	4-c-Hex	н		
15	Me	2-F	н	н	4-Hex	н		
	Et	2-Me	н	H	4-n-Amyl	H		
	Et	2-C1	н	Me	4-Ph	H		
	Et	2-F	н	Me	4-PhO	H		
20	н	2-Me	4-Me	Me	4-с-Нех	н		
	Ħ	2-Me	5-Me	Me	4-Hex	H		
	н	3-Me	4-Me	Me	4- <u>n</u> -Amyl	н		
25	н	2-Et	4-Et	H ·	3-C1	4-C1		
	н	2-Et	5-Et	Me	2-C1	4-C1		
	н	3-Et	4-Et	Me	2-C1	5-C1		
30	н	2-Me	5- <u>t</u> -Bu	Me	3-C1	4-C1		
	н	2-C1	4-C1	Et	2-C1	4-C1		
	н	2-C1	5-C1	Et	2-C1	5-C1		
	Et	3-MeO	н	Et	3-C1	4-C1		
35	Et	3-EtO	н	H	2-MeO	4-MeO		
	Et	3-CF3	н	н	3-MeO	5-MeO		
	Me	2-Me	4-Me	H	3-MeO	4-MeO		
40	Me	2-Me	5-Me	Me	2-MeO	4-MeO		
	Me	3-Me	4-Me	Me	3-MeO	5-MeO		
	Me	2-Et	4-Et	Me	3-MeO	4-MeO		
45	Me	2-Et	5-Et	Et	2-MeO	4-MeO		
	Me	3-Et	4-Et	£t	3-MeO	5-MeO		
	Me	2-Me	5- <u>t</u> -Bu	Et	3-MeO	4-MeO		
	Et	2-Me	4-Me	н	3-Br	5-Br		
50	Et	2-Me	5-Me	Me	3-Br	5-Br		

			R^2 , R^4 and R^7 are H, R^3 is Et					
	R ¹	R ⁵	R ⁶	R1	R ⁵	R ⁶		
5	Et	3-Br	5-Br	n-Pr	3- <u>n</u> -Pr	H		
	н	3-Me	5-Me	n-Pr	3-C1	н		
	Me	3-Me	5-Me	n-Pr	3-F	H		
10	Et	3-Me	5-Me	n-Pr	3-Br	н		
	н	3-C1	4-MeO	n-Pr	3-МеО	Н		
	Me	3-C1	4-Me0	n-Pr	3-EtO	Н		
15	Et	3-C1	4-Me0	n-Pr	3-CF3	H		
	Me	4-NMe ₂	н	<u>n</u> -Pr	3-CF3CH2O	H		
	Me	3-NMe ₂	н .	n-Pr	3-Me	4-Me		
	Et	4-NMe2	н	n-Pr	3-Me	5-Me		
20	Et	3-NMe ₂	н	n-Pr	3-C1	4-Cl		
	н	3-NH ₂	н	n-Pr	3-MeO	4-MeO		
	н	4-NH ₂	н	n-Pr	3-MeO	5-MeO		
25	Me	3-NH ₂	н	n-Pr	н	н		
	Me	4-NH ₂	н	n-Bu	Н	н		
	Et	3-NH ₂	н	n-Bu	4-Me	H		
	Et	4-NH2	н	n-Bu	4-Et	н		
30	n-Pr	4-NMe ₂	н	<u>n</u> -Bu	4- <u>n</u> -Pr	H		
	n-Pr	4-Me	н	n-Bu	4- <u>i</u> -Pr	H		
	n-Pr	4-Et	н	n-Bu	4-C1	H		
35	n-Pr	4-n-Pr	н	n-Bu	4-F	H		
	n-Pr	4-C1	н	<u>n</u> -Bu	4-Br	Н		
	n-Pr	4-F	н	n-Bu	4-MeO	H		
40	n-Pr	4-Br	н	n-Bu	4-EtO	H		
40	n-Pr	4-MeO	н	n-Bu	4-CF3	Н		
	n-Pr	4-EtO	н	n-Bu	4-CF3CH2O	н		
	n-Pr	4-CF3	н	n-Bu	3-Me	Н		
45	n-Pr	4-CF3CH20	н	n-Bu	3-Et	Н		
	n-Pr	3-NMe ₂	н	n-Bu	3- <u>n</u> -Pr	H		
	n-Pr	3-Me	н	n-Bu	3-C1	H		
50	n-Pr	3-Et	н	n-Bu	3-F	н.		

		R^2 , R^4 and R^7 are H, R^3 is Et							
	R1	R ⁵	R ⁶	R1	R ⁵	\mathbb{R}^6			
5	n-Bu	3-MeO	н	н	4-TMS	Н			
	n-Bu	3-EtO	н	н	4-I	н			
	n-Bu	3-CF3	H	H	4-1-BuO	н			
10	n-Bu	3-CF3CH2O	н	н	4-CF3 (CH2) 30	H			
	i-Pr	н	н	н	4-CF3 (CF2) 2	Н			
	i-Pr	4-Me	н	н	4-(CF ₃) ₂ CH	н			
	i-Pr	4-Et	н	н	4-CH3CHClCH	H			
15	i-Pr	4- <u>n</u> -Pr	н	Me	4-TMS	Н			
	i-Pr	4-1-Pr	н .	Me	4-1	н			
	i-Pr	4-C1	н	Me	4- <u>t</u> -BuO	H			
20	i-Pr	4-F	н	Me	4-CF3 (CH2) 30	н			
	i-Pr	4-Br	н	н	4-MeS	н			
	i-Pr	4-Me0	н	н	4-EtS	H			
25	i-Pr	4-EtO	н	H .	4-MeS (O)	н			
25	i-Pr	4-CF3	н	н	4- <u>i</u> -PrS(O)	н			
	i-Pr	4-CF3CH2O	н	н	4-MeS (O) 2	Ħ			
	1-Pr	3-Me	4-Me	н	4-CH ₂ =CH	н,			
30	1-Pr	3-Me	5-Me	н	4-CH2=C (CH3) C	н ₂ н			
	i-Pr	3-C1	4-C1	Ħ	4-CH2=CHCH2O	н			
	i-Pr	3-MeO	4-Me0	н	4-MeOCH ₂ CH ₂	Н			
35	i-Pr	3-MeO	5-MeO	н	4-MeOCH ₂ O	H			
	R ² j	.я н; к ³ is Me	; R ⁴ is H	R ²	is H; R ³ is Et;	R ⁴ is H;			
	R1	R ⁵ R ⁶	R ⁷	R ¹	R ⁵ R ⁶	B ⁷			
40	н	3-Me 4-Me	5-Me	н	3-Me 4-Me	5-Me			
	н	3-Br 4-Me	5-Br	H	3-Br 4-Me	5-Br			
	н	3~C1 4-MeC	5-C1	н	3-C1 4-MeO	5-C1			
45	н	3-MeO 4-MeO	5-Me0	н	3-MeO 4-MeO	5-MeO			

	R ²	is H; R ³	is Me; R4	1s H	R ²	18 H; R ³	is Et;	R ⁴ is H
	R1	R ⁵	₽ ₆	R7	$\mathbf{R^1}$	R ⁵	B 6	R ⁷
5	Me	3-Me	4-Me	5-Me	Me	3-Me	4-Me	5-Me
	Me	3-Br	4-Me	5-Br	Me	3-Br	4-Me	5-Br
	Me	3-C1	4-Me0	5-C1	Me	3-C1	4-Me	5-C1
10	Me	3-MeO	6-MeO	5-MeO	Me	3-MeO	4-MeO	5-MeO
	н	4-TMS	H	н	H	4-TMS	н	H
	Me	4-TMS	н	н	Me	4-TMS	H	H
	Et	4-TMS	H	н	Et	4-TMS	н	н
15	Et	3-Me	4-Me	5-Me	Et	3-Me	4-Me	5-Me
	Et	3-MeO	4-Me0	.5-MeO	Et	3-Me	4-MeO	5-MeO
	н	2-C1	5-Br	н	H	2-C1	5-Br	Н
20	Me	2-C1	5-Br	н .	Me	2-C1	5-Br	H
R^3 is Me; R^4 is H; R^7 is H								
	R1	E ²	R ⁵	R ⁶	Rl	R ² 1	₃ 5	R6
25	Me	4-Me	H	н	Me	4-Me	3-Me	H
	Me	4-Me	4-Me	н	Me	4-Me	3-C1	H
	Me	4-Me	4-C1	н	Me	4-Me	3-Me0	Н
30	ме	4-Me	4-MeO	н	Me	4-Me	3-EtO	Н
	Me	4-Me	4-EtO	Н	Me	4-Me	3-Et	н
	Me	4-Me	4-Et	н	Me	4-Me	3- <u>1</u> -P	r H
35	Me	4-Me	4- <u>i</u> -Pr	н	Ме	4-Et	Ħ	Н

5۾	1 .	Me;	R ⁴	1.8	H:	R ⁷	is	H	
К-	1.3	me.		13	***	• • •	~ 5		

	R ¹	R ²	R ⁵	R ⁶	R ¹	R ²	R ⁵	R6
	Me	4-Et	4-Me	н	Me	4-Me	3-MeO	5-MeO
5	Me	4-Et	4-C1	н	н	6-OH	H	н
	Me	4-Et	4-MeO	н	H	6-OMe	н	H
	Me	4-Et	4-EtO	н	H	6-OEt	н	н
10	Me	4-Et	4-Et	н	H	6-0C (O) Me	H .	H
,,,	Me	4-Et	4- <u>1</u> -Pr	п	н	5-0H	H	H
	Me	4-Et	3-Me	н	H	5-OMe	н	Н
	Me	4-Et	3-C1	н	H	5-OEt	H	н
15	Me	4-Et	3-MeO	н	H	5-Br	H	н
	Me	4-Et	3-EtO	н.	H	5-Me	н	н
	Me	4-Et	3-Et	н	H	6-Me	н	н
20	Me	4-Et	3- <u>1</u> -Pr	н	н	6-OH	4-Me	н
	Et	4-Et	H	н	Н	6-OMe	3-Me	H
	Et	4-Et	4-Me	н	H	6-OMe	3-Me	4-Me
25	Et	4-Et	4-C1	н	Н	6-OEt	4-C1	Н
25	Et	4-Et	4-MeO	н	H	5-OMe	4-F	Н
	Et	4-Et	4-EtO	н	H	5-OMe	3-C1	Н
	Et	4-Et	4-Et	н	Н	5-OMe	4-C1	Н
30	Et	4-Et	4- <u>1</u> -Pr	н	H	5-Br	4-C1	н
	Me	4-Me	3-Me	4-Me	Me	6-он	Н	Н
	Me	4-Me	3-Me	5-Me	Me	6-OMe	н	н
35	Me	4-Me	3-C1	4-C1	Me	4-n-Pr	Н	Н
	Me	4-Me	3-C1	5-C1	Et	4- <u>n</u> -Pr	H	Н
	Me	4-Me	3-MeO	4-MeO				

TABLE 27

5 10			Me	N N N	1 13	R ⁶ R ⁷
	R ¹	R ³	R ⁵	R ⁶	B 7	R ²³
20	н	Me	н	H	н .	н
	н	Me	н	H	Me	Н
	н	Me	н	н	Et	н
25	н	Me	н	Н	<u>i</u> -Pr	Н
	Н	Me	н	H	Cl	н
	н	Me	н	Н	OMe	H
30	н	Me	н	Me .	Me	н
30	н	Me	н	Et	Et	H
	н	Me	H	H	Me	н
	н	Me	H	H	H	C (O) OMe
35	н	Me	H	н	ме	C (O) NHPh
	н	H	н	н	н	H
	н	н	н	H	Me	H :
40	н	Н	H	H	OMe	H
	Н	Н	н	Н	Et	C (O) OMe
	Н	Н	н	H	Cl	C (O) NHPh
	н	Et	H	H	H	н
45	Н	Et	н	Н	Me	Н
	Me	н	H	H	H	Н
	Me	н	Н	н	Me	н
50	Me	H	н	н	CI	н
	Me _	н	Н	н	OMe	Н

55

	R ¹	R ³	B ⁵	B ⁶	R ⁷	R ²³
	Et	н	H	н	н	H
	Et	н	н	H	Me	H
5	Et	н	н	н	Cl	н
	Et	н	н	H	OMe	H
	i-Pr	н	н	H	Me	н
10	i-Pr	н	H	н	C1	н
	i-Pr	н	н	н	OMe	H
	i-Pr	Н	н	н	H	н
	Me	Ме	н	H	H	н
15	Me	Me	H	н	Me .	н
	Me	Me	н .	н	Cl	н
	Me	Me	н	н	OMe	н
20	Et	Me	H	Н	Me	Н
	Et	Me	н	н	Cl	H
	Et	Me	н	Н	OMe	н
25	<u>i</u> -Pr	Me	Н	н	Me	н
	i-Pr	Me	H	н	Cl	н
	<u>i</u> -Pr	Me	Н	H	OMe	н
	н	Me	2-Me	Н	H .	н
30	н	Me	2-C1	н	н	н
	Et	Me	Н	H	н	C(S)NHPh
	Et	Me	н	н	н	S (0) Ph
3 5	Et	Me	н	н	н	\$ (0) ₂ Me
	Et	Me	H ·	H	н	s (0) 2NMe2
	Et	Me	н	н	н	P(O)(OEt)2
40	<u>1</u> -Pr	Me	н	н	н	P(S)(OEt)2
	i-Pr	Me	н	, H	Н	Me
	i-Pr	Me	н	н	н	CH ₂ Ph

TABLE 28

5	R ⁴ R ³
10	N N R ²³
15	R ¹ 6 R ⁷ 5 R6

					R^3 and I	R ⁴ are	e Me			
20	R1	B ⁵	R 6	R ⁷	R ²³	R1	R ⁵	\mathbb{R}^6	R7	R ²³
20	н	н	Me	н	н	Me	н	n-Pr	Н	н
	н	н	Et	н	н	Me	н	<u>i</u> -Pr	н	H
	н	н	i-Pr	н	н	Me	н	Cl	н	H
25	Н	Н	OMe	Н	н	Me	H	OMe	H	H
	н	н	n-Pr	Н	н	Me	3-Me	Me	H	H
	н	н	Cl	н	н	Me	3-Et	Et	н	H
30	н	3-Me	Me .	н	н	Et	H.	H	Н	н
	н	3-Et	Et	н	н	Et	H	Me	H	н
	н	2-Et	Et	Н	н	Et	H	Et	H	H
25	н	2-Me	Me	н	н	Et	3-Me	Me	H	H
35	Н	2-Me	н	5-Me	н	Et	н	Cl	H	H
	н	3-C1	H	н	н	Et	н	OMe	H	H
	н	3-Me	H	н	H	н	н	Me	H	C (0) OMe
40	н	3-CF3	н	н	н	н	н	Et	H	C (0) OMe
	н	3-ОМе	н	н	н	H	н	1-Pr	Н	C (0) OMe
	н	2-Me	н	н	н	н	3-Me	Me	H	C (0) OMe
45	H	н	Н	H	н	Me	н	Me	H	C (O) NHPh
	Ме	н	H	H	н	Me	H	Et	H	C (O) NHMe
	Me	н	Me	н	н	Me	3-Me	Me	Н	C (O) NHPh
	Me	н	Et	H	н	Me	H	OMe	H .	Me

					R ³ is Me	, R ⁴	1s H			
	R1	R ⁵	R ⁶	R7	R ²³	R1	B ⁵	\mathbb{R}^6	R7	R ²³
	н	н	Me	H	н	Me	н	n-Pr	H	H
5	н	н	Et	H	н	Ме	H	<u>i</u> -Pr	H	Н
	H	н	<u>i</u> -Pr	Ħ	н	Me	Н	Cl	H	н
	н	н	OMe	н	н	Me	н	OMe	H	Н
10	H	н	v-br	н	H	Me	3-Me	Me	H	н
	н	н	Cl	н	н	Me	3-Et	Et	н	н
	н	3-Me	Me	н .	н	Et	н	H	н	H
15	H	3-Et	Et	Н	H	Et	н	Me	н	H
	н	2-Et	Et	H	н	Et	н	Et	H	Ħ
	H	2-Me	Me	H	H .	Et	3-Me	ме	H	H
	Н	2-Me	Н	5-Me	H	Et	H	Cl	H	H
20	Н	3-C1	Н	H	H	Et	Н	OMe	Н	H
	н	3-Me	н	н	Н	н	H	Me	Н	C (0) OMe
	н	3-CF3	н	Н	н	н	н	Et	Н	C (O) OMe
25	н	3-0Me	H	Н	H	н	Н	<u>i</u> -Pr	H	C (0) OMe
	н	2-Me	н	н	H	н	3-Me	Me	H	C (0) OMe
	H	н	н	H	Н	Me	H	Me	Н	C (O) NHPh
30	Me	Н	H	H	H	Me	H	Et	H	C (O) NHMe
00	Me	Н	Me	Н	Н	Me	3-Me	Me	H	C (O) NHPh
	Me	н	Et	Н	н	Me	H	OMe	H	Me
						ī				
35					R ³ is Me	1	is Et		_	
	R1	\mathbb{R}^5	\mathbb{R}^6	R ⁷	R ²³	R1	\mathbb{R}^5	R ⁶	R ⁷	R ²³
	н	H	Me	\mathbf{H}_{\perp}	н	Ме	н	N-br	H	Н
40	H	н	Et	H	H	Me	н	<u>i</u> -Pr	H	Н
	H	H	<u>i</u> -Pr	н	Н	Me	Н	Cl	H	н
	H	H	OMe	н	н	Me	H	OMe	H	н
40	H	Н	n-Pr	H	н	Me	3-Me	Me	H	Н
45	H	H	Cl	H	н	Ме	3-Et	Et	H	Н
	H	3-Me	Me	н	н	Et	H	H	H	H

50

					R ³ is Me	, R4	is Et			
	R1	R ⁵	B6	B ⁷	R ²³	R1	\mathbb{R}^5	R ⁶	R ⁷	R ²³
6	н	3-Et	Et	н	н	Et	н	Me	H	Н
	н	2-Et	Et	Н	н	Et	H	Et	H	Н
	н	2-Me	Me	н	н	Et	3~Me	Me	H	H
10	н	2-Me	н	5-Me	н	Et	H	Cl	н	н
	н	3-C1	н	H	н	Et	н	OMe	H	H
	H	3-Me	н	н	н	н	H	Me	H	C (0) OMe
	H	3-CF3	н	н	н	н	H	Et	H	C (0) OMe
15	H	3-ОМе	н	Н	н	н	H	i-Pr	H	C (0) OMe
	H	2-Me	н	н	H	н	3-Me	Me	H	C (0) OMe
	н	н	н	н	Н	Me	н	Me	н	C (O) NHPh
20	Me	н	н	н	н	Me	н	Et	H	C (O) NHMe
	Me	н	Me	н	н	Me	3-Me	Me	H	C (O) NHPh
	Me	н	Et	н	Н	Me	н	OMe	H	Me

25

TABLE 29

TABLE 30

5	Me Me											
10				N N R ⁵								
15						/\	5					
	R ¹	B ⁵	R ⁶	MLm	R1	R ⁵	R ⁶	MLm				
	н	н	н	znCl ₂	Et	H	H	MnCl ₂				
20	н	н	н	CuCl ₂	i-Pr	н	н	ZnCl ₂				
	Н	н	н	FeCl3	i-Pr	н	H	FeCl ₃				
	Me	н	н	znCl ₂	Me	H	Me	ZnCl ₂				
25	Ме	н	н	CuCl ₂	Me	н	Me	CuCl ₂				
	Me	н	н	FeCl ₃	Me	н	Me	FeCl ₃				
	Me	н	,H	MnCl ₂	<u>i</u> -Pr	н	Me	MnCl ₂				
30	Me	н	н	MgCl ₂	Et	H	Me	MgCl ₂				
	Et	н	Ħ	ZnCl ₂	н	Me	Me	ZnCl ₂				
	Et	н	н	CuCl ₂								

TABLE 31

5	Me Me
10	N ML _m 2 R ⁵
15	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	, and to 2001 -

					ML _m 18	znci;	2		
20	B1	₽ ₅	B ⁶	B7		B1	R ⁵	R ⁶	R7
	н	н	Me	н		Me	н	н	H
	н	н	Et	н		Me	H	Me	н
25	н	н	<u>i</u> -Pr	н		Me	н	Et	Н
23	н	н	OMe	н		Me	н	n-Pr	н
	н	н	n-Pr	н		Me	н	<u>i-Pr</u>	H
	н	н	Cl	н		Me	н	Cl	Н
30	Н	3-ме	Me	н		Me	н	OMe	H
	н	3-Et	Et	н		Me	3-Me	Me	H
	н	2-Et	Et	н		Me	3-Et	Et	н
35	н	2-Me	Me	н		Et	н	H	н
•	н	2-Me	н	5-Me		Et	н	Me	н
	н	3-C1	н	H		Et	H	Et	н
	н	3-Me	н	н		Et	3-Me	Me	H
40	н	3-CF ₃	н	н		Et	н	Cl	н
	н	3-0He	н	н		Et	н	ÇMe	н
		2-Me	H	н		Me	3-C1	н	н
45	H	z-me u	н	н					

50

					ML_{m}	is	FeCl ₃			
	R1	R ⁵	R ⁶	B 7		1	R1	R ⁵	R6	R7
5	н	н	ме	H			Me	н	H	H
J	н	н	Et	H		1	Me	H	Me	H
	H	н	<u>i</u> -Pr	н			Me	H	Et	Н
	н	н	OMe	H			Me	н	n-Pr	H
10	H	н	n-Pr	H			Me	н	<u>i</u> -Pr	H
	н	н	Cl	н			Me	Н	CI	H
	н	3-Me	Me	н			Me	н	OMe	н
15	н	3-Et	Et	н		۱	Me	3-Me	Me	н
	н	2-Et	Et	н		Į	Me	3~Et	Et	н
	н	2-Me	Ме	H		1	Et	Н	Н	H
	н	2-Me	Н	5-Me		1	Et	Н	Me	H
20	H	3-C1	Н	H		1	Et	н	Et	н
	н	3-Me	н	Н		1	Et	3-Me	Me	H
	н	3-CF3	Н	H		1	Et	H	Cl	H
25	н	3-оме	Н	н		-	Et	н	OMe	Н
	н	2-Me	н.	Н			Me	3-C1	Н	н
	н	н	н	H		1				
30							•			
00			•		$\mathtt{ML}_{\mathtt{m}}$	is	CuCl ₂			_
	B1	R ⁵	R ⁶	R7		1	R1	R ⁵	R ⁶	R ⁷
	H	H	Me	Н		1	Me	H	H	н
35	н	н	Et	н		1	Me	H.	Me	H
	н	н	i-Pr	Н		1	Me	H	Et	H
	H	Н	OMe	H			Me	Н	n-pr	Н
40	н	H	n-Pr	H			Me	H	<u>i</u> -Pr	н
	н	H	Cl	Н			Me	H	Cl	н
	н	3-Me	Me	H			Me	H	OMe	H
45	H	3-Et	Et	н			Me	3-Me	Me	Н
45	н	2-Et	Et	Н			Me	3-Et	Et	н
	н	2-Me	Me	Н			Et	H	Н	H
	H	2-Me	н	5-Me			Et	H	Me	·H
50	H	3-C1	Н	H		1	Et	н	Et	H

					ML _m i	s CuCl	2		
	R ¹	<u>r</u> 5	R ⁶	B 7		₂ 1	_p .5	R ⁶	R7
5	H	3-Me	н	н		Et	3-M o	Me	н
Ū	н	3-CF3	н	н		Et	3-Me H H 3-C1	Cl	н
	н	3-OMe	H	н		Et	н	OMe	H
	H	2-Me	н	H		Me	3-C1	Н	Н
.10	H	H	H	H					
					m _m i	s MnCl	2		-
15	\mathbb{R}^1	R ⁵	₽ę	R7		R1	B ⁵	R6	R7
	H	H	Me ·	Н		н	H	H	H
	H	н	Et	H.		Me	н	н	H
20	н	н	i-Pr	н		Me	Н	Me	H
20	н	н	OMe	н		Me	. H	Et	н
	H	H	n-Pr	Н		Me	Н	n-Pr	H
	H	H	Cl	Н		Me	H	i-Pr	Н
25	н	3-Ме	Ме	H		Me	H	Cl	H
	H	3-Et	Et	Ħ		Me	H	OMe	H
	H	2-Et	Et	H		Me	3-Me	Me	H
30	Н	2-Me	Me	H		Me	3-Et	Et	н
	н	2-Me	н	5-Me		Et	н	H	H
	н	3-Cl	H	H		Et	H	Me	H
	н	3-Me	H	н		Et	н	Et	H
35	H	3-CF3	H	н		Et	3-Me	Me	H
	н	3-0Me	н	Н		Et	н	Cl	H
	н	2-Me	н	Н		Et	н	OMe	H

					MLm 1	MgCl ₂			
	R1	R ⁵	R ⁶	R7		R ¹	B ⁵	\mathbb{R}^6	B 7
5	н	н	Me	н		н	H	Н	H
_	H	н	Et	H		Me	н	н	H
	н	н	i-Pr	н		Me	н	Me	H
	н	н	OMe	H		Me	H	Et	Н
10	н	н	n-Pr	н		Me	н	n-Pr	Н
	H	н	Cl	н		Me	н	1-Pr	H
	н	3-Me	Me	H		Me	H	Cl	H
15	н	3-Et	Et	H		Me	н	CMe	H
	H	2-Et	Et	H		Me	3-Me	Me	H
	н	2-Me	Me	H		Me	3-Et	Et	н
	н	2-Me	H	5-Me		Et	H	H	H
20	н	3-C1	н	H		Et	н	Me	н
	н	3-Me	н	н		Et	н .	Et	Н
	H	3-CF3	н	н		Et	3-Me	Me	H
25	н	3-OMe	Н	Н		Et	H	Cl	H
	н	2-Me	H	н		Et	H	OMe	H

TABLE 32

30	Andria da,
	Me Me
35	N ML _m
40	R^1 $\frac{ }{ }$ R^5

45	R1	B 5	R6	R ⁷	R1	\mathbb{R}^5	\mathbb{R}^6	B 7
	н	н	н	znCl ₂	Me	н	H	znc1 ₂
	н	Ħ	Me	FeCl ₃	Me	H	Me	CuCl ₂
50	н	н	Et	CuCl ₂	Me	H	Et	MnCl ₂
	н	н	i-Pr	MnCl ₂	Me	н	OMe	MgCl ₂
	. н	3-Me	Me	MgCl ₂	Me	н	Cl	znCl ₂
	н	H	Cl	FeCl ₃	1			

TABLE 33

15		
	R ¹ is Me, R ⁵ is H, R ⁶ is H	R^1 is H, R^5 is Me, R^6 is H
	R ²³	R ²³
20	Ме	Ме
	CH ₂ Ph	CH ₂ Ph
	сн ₂ сн=сн ₂	CH ₂ CH=CH ₂
25	CH ₂ C#CH	CH ₂ C=CH
20	C (-0) Me	C (-0) Me
	C (=0) Ph	C (=0) Ph
	C (-0) OMe	C (=0) OMe
30	C(-0) OPh	C (=0) OPh
	S (-0) Me	S (=0)Me
	C (=0) Ph	Č (=0) Ph
35	S (=0) 2Me	S (=0) 2 ^{Me}
	S (-0) 2Ph	S (=0) 2Ph
	C (=0) NHMe	C (=O) NHMe
	C (-0) NHPh	C (-O) NHPh
40	C (-0) NMe ₂	C (=0) NMe ₂
	C (=S) NHMe	C (=S) NHMe
	C (=S) NHPh	C (=S) NHPh
45	P (-S) (OEt) 2	P (=S) (OEt) ₂
	P(-0)(OEt) ₂	P(-0)(OEt) ₂
	S(=0)2NEt2	s (-0) 2NEt2

```
\mathbb{R}^1 is H, \mathbb{R}^5 is Me, \mathbb{R}^6 is Me
             R^1 is Me, R^5 is H, R^6 is Me
                                                                    R<sup>23</sup>
             B<sup>23</sup>
5
                                                                    Me
             Me
                                                                     CH<sub>2</sub>Ph
             CH<sub>2</sub>Ph
                                                                     CH2CH-CH2
             си2си-си2
                                                                     CH<sub>2</sub>C≡CH
10
             CH2C=CH
                                                                     C (=0) Me
             C (-0) Me
                                                                     C (=0) Ph
             C (=0) Ph
                                                                     C (-0) OMe
             C (=0) OMe
15
                                                                     C (=0) OPh
             C (=0) OPh
                                                                     S (=0) Me
             s (-0) Me
                                                                     C (=0) Ph
             C (=0) Ph
                                                                     S (=0) 2Me
20
             S (=0) 2Me
                                                                     S (-0) 2Ph
             S (=0) 2Ph
                                                                     C (=0) NHMe
             C (=0) NHMe
                                                                     C (-0) NHPh
             C (=0) NHPh
25
                                                                     C (-0) NMe2
             C (-0) NMe2
                                                                     C (=S) NHMe
             C (=S) NHMe
                                                                     C (=S) NHPh
             C (=S) NHPh
30
                                                                     P (-S) (OEt) 2
             P (-S) (OEt) 2
                                                                     P (=0) (OEt) 2
             P (=0) (OEt) 2
                                                                     S (-0) 2NEt2
             S (-0) 2NEt2
35
                                                                    \mathbb{R}^1 is Me, \mathbb{R}^5 is Me, \mathbb{R}^6 is Me
             \mathbb{R}^1 is Me, \mathbb{R}^5 is H, \mathbb{R}^6 is OMe
                                                                    B<sup>23</sup>
             R<sup>23</sup>
                                                                    Me
             Me
                                                                     CH<sub>2</sub>Ph
             CH2Ph
                                                                     сн<sub>2</sub>сн-сн<sub>2</sub>
             CH2CH-CH2
                                                                     сн<sub>2</sub>с≖сн
             сн<sub>2</sub>с=сн
                                                                     C (=0) Me
 45
             C (=0) Me
                                                                     C (=0) Ph
             C (=0) Ph
                                                                     C (-0) OMe
             C (-0) OMe
```

50

```
R^1 is Me, R^5 is Me, R^6 is Me
            \mathbb{R}^1 is Me, \mathbb{R}^5 is H, \mathbb{R}^6 is OMe
                                                            B<sup>23</sup>
            R<sup>23</sup>
                                                            C (-0) OPhS
            C (-0) OPh
                                                            (-0) Me
            S (-0) Me
                                                            C (=0) Ph
            C (-0) Ph
10
                                                            S (-0) 2Me
            S (-0) 2Me
                                                            S (-0) 2Ph
            S (=0) 2Ph
                                                            C (=0) NHMe
            C (-0) NHMe
                                                            C (-0) NHPh
            C (-0) NHPh
15
                                                            C (=0) NMe2
            C (=0) NMe2
                                                            C (=S) NHMe
            C (-S) NHMe
                                                            C (=S) NHPh
            C (-S) NHPh
20
                                                            P (-S) (OEt) 2
            P (-S) (OEt) 2
                                                            P(=0)(OEt)2
            P (-0) (OEt) 2
                                                            S (=0) 2NEt2
            S (-0) 2NEt2
25
                                                            R1 is Et. R5 is H, R6 is H
            R^1 is H, R^5 is C1, R^6 is H
                                                            R<sup>23</sup>
            R23
                                                            Me .
            Ме
30
                                                            CH<sub>2</sub>Ph
            CH<sub>2</sub>Ph
                                                            CH2CH=CH2
            CH2CH=CH2
                                                            CH2C#CH
            сн<sub>2</sub>с⊯сн
35
                                                            C (=0) Me -
            C (=0) Me
                                                            C (=0) Ph
            C (=0) Ph
                                                            C (=0) OMe
            C (=0) OMe
                                                            C (-0) OPh
            C (-0) OPh
40
            S (=0) Me
                                                            S (-0) Me
                                                            C (=0) Ph
            C (=0) Ph
                                                            S (-0) 2Me
            S (=0) 2Me
45
                                                            S (=0) 2Ph
            S (=0) 2Ph
                                                            C (-0) NHMe
            C (-0) NHMe
```

50

```
R^1 is H, R^5 is H, R^6 is H
           R^1 is Et, R^5 is C1, R^6 is H
                                                           R<sup>23</sup>
           R<sup>23</sup>
                                                           C (-O) NHPh
           C (-0) NHPh
                                                            C (-0) NMe2
            C (=0) NMe2
                                                           C (-0) NPh2
            C (=S) NHMe
                                                           C (-S) NHMe
            C (-S) NHPh
                                                            C (=S) NHPh
            P (=S) (OEt) 2
                                                           P (=S) (OEt) 2
            P (=0) (OEt) 2
                                                            P (=0) (OEt) 2
            s (=0) 2NEt2
15
                                                            S (-0) 2NEt2
                                                           R^1 is H, R^5 is H, R^6 is OMe
            \mathbb{R}^1 is H, \mathbb{R}^5 is H, \mathbb{R}^6 is Me
                                                           R<sup>23</sup>
            R<sup>23</sup>
20
                                                           Me
            Me
                                                            CH<sub>2</sub>Ph
            CH<sub>2</sub>Ph
                                                            CH2CH=CH2
            CH2CH-CH2
                                                            CH2C≖CH
            CH2C≖CH
25
                                                            C (=0) Me
            C (=0) Me
                                                            C (=0) Ph
            C (=0) Ph
                                                            C (-0) OMe
            C (-0) OMe
30
                                                            C (=0) OPh
            C (=0) OPh
                                                            S (=0) Me
            S (=0) Me
                                                           C (=0) Ph
            C (=0) Ph
                                                           S (=0) 2Me
35
            S (=0) 2Me
                                                           S (=0) 2Ph
            S (=0) 2Ph
                                                           C (-0) NHMe
            C (=0) NHMe
                                                           C (-0) NHPh
            C (-0) NHPh
40
                                                           C (-0) NMe2
            C (=0) NMe2
                                                           C (=0) NPh2
            C (=S) NHMe
                                                           C (=5) NHMe
            C (=S) NHPh
45
                                                           C (=S) NHPh
            P (=S) (OEt) 2
                                                           P (-S) (OEt) 2
            P (-0) (OEt) 2
                                                           P (-0) (OEt) 2
            S (-0) 2NEt2
                                                           S (-0) 2NEt2
50
```

TABLE 34

 ${
m R}^{1}$, ${
m R}^{2}$ and ${
m R}^{3}$ are H; ${
m R}^{4}$ is 6-Et E 1-naphthalenyl 2-furanyl

2-furanyl
2-naphthalenyl
3-thienyl

2,5-dimethyl-3-furanyl
2,5-dimethyl-3-thienyl

4-methylphenoxy 2-chlorophenoxy

2,6~dimethylphenoxy 3-methylphenylthio

phenylamino

benzyl
40 Et

sec-Bu c-propyl

45 <u>cis-2-methylcycloheptyl</u>

sec-butylthio

 \mathbb{R}^1 and \mathbb{R}^2 are H; \mathbb{R}^3 is Me; \mathbb{R}^4 is H

E

1-naphthalenyl

2-furanyl

2-naphthalenyl

3-thienyl

2,5-dimethyl-3-furanyl

2,5-dimethyl-3-thienyl

4-methylphenoxy

2-chlorophenoxy

2,6-dimethylphenoxy

4-cyanophenylthio

4-methylphenylamino

Cl

n-hex

Me

c-hexyl

 $CF_3CH_2CH_2$

n-butoxy

55

```
R^1 and R^2 are H; R^3 is Me; R^4 is H
          R^1, R^2 and R^3 are H; R^4 is 6-Et
                                                   C1 (CH<sub>2</sub>) 50
         CF3CH2O
                                                   4-methyl-3-furanyl
         5-methy1-2-thienyl
                                                   2-methyl-3-pyridyl
         5-methy1-2-pyridy1
10
                                                     R^1 and R^3 are Me; R^2 and R^4 are H;
           R1 and R3 are Me; R2 is 5-Me;
                        R4 is H
15
                                                   E
                                                   2-methyl-3-pyridyl
         5-methyl-2-pyridyl
                                                   4-chloro-3-pyridyl
         4-pyridyl
                                                   2-indanyl
         2-indanyl
20
                                                   2-tetrahydronaphthalenyl
         2-tetrahydronaphthalenyl
                                                   6-Me-3-pyridyl
         6-Me-3-pyridyl
                                                   2-pyridyl
         2-pyridyl
                                                   1-naphthalenyl
25
               R^1, R^2, R^3 and R^4 are H
                                                   2-furanyl
                                                    3-thienyl
                                                   3-pyridyl
         1-naphthalenyl
30
         2-furanyl
         3-thienyl
         3-pyridyl
35
                                                             \mathbb{R}^3 is Me; \mathbb{R}^4 is 6-Me
                R^3 is Me; R^4 is 6-Me
                                                          \mathbb{R}^2
                                                                         E
                 \mathbb{R}^2
                                                   \mathbb{R}^1
         R^{1}
                              E
                                                          5-Et
                                                                         Ph
                              Ph
                                                   H
         Н
                 5-Me
                                                                         2-Me-Ph
                                                          5-<u>sec</u>-Bu
                 5-<u>i</u>-Pr
                              2-Me-Ph
                              2-C1-Ph
                                                          5-CF3 (CF2) 3
                                                                         2-Cl-Ph
                 5-<u>n</u>-Bu
                              2-MeO-Ph
                                                          5-<u>t</u>-Bu
                                                                         2-MeO-Ph
                 5-CN
                                                   н
                              CF3CH2O-Ph
                                                   н
                                                          5-FCH2
                                                                         2-CF3CH2O-Ph
                 5-CF3
45
                                                                         1-naphthalenyl
                              1-naphthalenyl
                                                   н
                                                          6-n-Pr
                 6-CF3CH2
                                                          4-Me
                                                                         Ph
                              Ph
         i-Pr
                 5-Me
                                                   Me
                                                                         2-Me-Ph
                                                          4-Me
                              2-Me-Ph
         1-Pr
                 5-Me
50
```

	R ³ is Me	; R ⁴ is 6-Me	
	R ¹	R ²	E
5	<u>i</u> -Pr	5-Me	2-C1-Ph
V	i-Pr	5-Me	2-MeO-Ph
	1-Pr	6-He	2-CF3CH2O-Ph
	C1	н	Ph
10	F	н	4-Me-Ph
	CF3CF2	н	4-C1-Ph
	CH2=CHCH2	н	4-MeO-Ph
15			
	R ³ is M	e; R ⁴ is H	
	R ¹	· R ²	£
	CO ₂ Me	H ·	2-CF3CH2O-Ph
20	2-Me-Ph	H	Me
	Bzl	н	Ph
	2-naphthalenyl	н	n-Bu
25	3-thienyl	- н	CF3CF2
	3-pyridyl	н	Me
	Си	5-Me	Ph
30	<u>t</u> -Bu	5-Me	2-Me-Ph
	C1CH ₂	5-Me	2-C1-Ph
	Et	5-Me	2-MeO-Ph
	n-Pr	5-Me	2-CF ₃ CH ₂ O-Ph
35	Me	4-Me	2-CF3-Ph
	<u>1</u> -Pr	4-Me	2-CF ₃ -Ph
	CF ₃	4-CF3	2-CF3-Ph

	R ³ is 1	et; R ⁴ is H	
	R ¹	R ²	E
	Ме	4-Me	2-TMS-Ph
5	Ме	4-Me	2-C1-Ph
	Ме	4-Me	2-MeO-Ph
	Me	4-Me	2-CF3CH2O-Ph
10	Br	н	Ph
	CN	H	4-Me-Ph
	Ac	н	4-C1-Ph
	сн₃с≖ссн₂	Н	4-MeO-Ph
15			
	R^3 is	Me; R^4 is 6-M	le
	B1	R ²	E
20	CO ₂ Et	н	2-CF3CH2O-Ph
	4-Cl-Ph	н	Ph
	5-Me-3-furyl	н	<u>i</u> -Pr
or.	EtCO	н	2-Cl-Ph
25	2-furyl	4-Me	CF ₃
	Ph	5-Me	Me
	CN	4-Me	Ph
30	<u>t</u> -Bu	4-Me	2-Me-Ph
	FCH ₂	4-Me	2-C1-Ph
	Et	4Me	2-MeO-Ph
35	C1 (CH ₂) 4	4-Me	2-CF3CH2O-Ph
		4 44-	0.00 06

45

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55

4-Me

5-CN

5-Me

4-Me

Me

<u>i-Pr</u>

CF3

<u>1</u>-Pr

2-CF₃-Ph

2-CF3-Ph

2-CF3-Ph

2-TMS-Ph

TABLE 35

5		Me N N	Me
10	ſ	N N	R ⁵
15	R ⁸	\nearrow	Re-

	56	R^5 is H, R^6 is Me	R ⁵ is H, R ⁶ is MeO
	R ⁵ and R ⁶ are H	R ⁸	R ⁸
20	R ⁸		
	н	Н	н
	2-Me	2-Me	2-Me
	2-C1	2-C1	2-C1
25	2-Br	2-Br	2-Br
	2-MeO	2-MeO	2-Me0
	3-Me	3-Me	3-Me
30	3-C1	3-C1	3-C1
	3-Br	3-Br	3-Br
	3-MeO	3-MeO	3-Me0
0.5	4-Me	4-Me	4-Me
35	4-C1	4-C1	4-Cl
	4-Br	4-Br	4-Br
	4-MeO	4-MeO	4-MeO
40	3-CF ₃	3-CF ₃	3-CF ₃
	4-CF3	4-CF ₃	4-CF ₃
45	R^5 is 3-Me, R^6 is Me	R^5 is H, R^6 is Cl	R^5 is 2-Me, R^6 is H
	R ⁸	R ⁸	B ⁸
	Н	н	н .
	2-Me	2-Me	2-Me
50	2-C1 _	2-C1	2-C1

	R^5 is 3-Me, R^6 is Me	R ⁵ is H, R ⁶ is Cl	R^5 is 2-Me, R^6 is H
	R ⁸	R ⁸	R ⁸
5	2-Br	2-Br	2-Br
3	2-MeO	2-MeO	2-MeO
	3-Me	3-Me	3-Me
	3-C1	3-C1	3-C1
10	3-Br	3-Br	3-Br
	3-MeO	3-MeO	3-MeO
	4-Me	4-Me	4-Me
15	4-C1	4-C1	4-C1
	4-Br	4-Br	4-Br
	4-MeO	4-MeO	4-MeO
	3-CF3	3-CF3	3-CF3
20	4-CF3	4-CF3	4-CF ₃

Formulations

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Useful formulations of the compounds of Formulae I-VI can be prepared in conventional ways in the form of dusts, granules, pellets, solutions, suspensions, emulsions, wettable powders, emulsifiable concentrates and the like. Many of these formulations may be applied directly. Sprayable formulations can be extended in suitable media and used at spray volumes of from a few liters to several hundred liters per hectare. High strength compositions are primarily used as intermediates for further formulation. The formulations, broadly, contain about 0.1% to 99% by weight of active ingredient(s) and at least one of (a) about 0.1% to 20% surfactant(s) and (b) about 1% to 99.9% solid or liquid inert diluent(s). More specifically, they may contain these ingredients in the following approximate proportions:

35	Formulation	Ingredient	Weight Pe	rcent* Surfactant(s)
	Wettable Powders	20-90	0-74	1-10
40	Oil Suspensions, Emulsions, Solutions, (including Emulsifiable Concentrates)	3-50	40-95	0~15
45	Aqueous Suspension	10-50	40-84	1-20
	Dusts	1-25	70-99	0-5
	Granules and Pellets	0.1-95	5-99.9	0-15
50	High Strength Compositions	90-99	0-10	0-2

^{*}Active ingredients plus at least one of a surfactant or a diluent equals 100 weight percent.

Lower or higher levels of active ingredient-can, of course, be present depending on the intended use and the physical properties of the compound. Higher ratios of surfactant to active ingredient are sometimes desir-

able, and are achieved by incorporation into the formulation or by tank mixing.

Typical solid diluents are described in Watkins et al., "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Dorland Books, Caldwell, New Jersey, but other solids, either mined or manufactured, may be used. The more absorptive diluents are preferred for wettable powders and the denser ones for dusts. Typical liquid diluents and solvents are described in Marsden, "Solvents Guide", 2nd Ed., Interscience, New York, 1950. Solubility under 0.1% is preferred for suspension concentrates; solution concentrates are preferably stable against phase separation at 0°C. "McCutcheon's Detergents and Emulsifiers Annual", MC Publishing Corp., Ridgewood, New Jersey, as well as Sisely and Wood, "Encyclopedia of Surface Active Agents", Chemical Publishing Co., Inc., NewYork, 1964, list surfactants and recommended uses. All formulations can contain minor amounts of additives to reduce foaming, caking, corrosion, microbiological growth, etc.

The methods of making such compositions are well known. Solutions are prepared by simply mixing the ingredients. Fine solid compositions are made by blending and, usually, grinding as in a hammer or fluid energy mill. Suspensions are prepared by wet milling (see, for example, U.S. Patent 3,060,084). Granules and pellets may be made by spraying the active material upon preformed granular carriers or by agglomeration techniques. See J.E.Browning, "Agglomeration", Chemical Engineering, December 4, 1967, pp. 147ff and "Perry's Chemical Engineer's Handbook", 5th Ed., McGraw-Hill, New York, 1973, pp. 8-59ff.

For further information regarding the art of formulation, see for example:

U.S. Patent 3,235,361;

U.S. Patent 3,309,192;

U.S. Patent 2,891,855; and

G. C. Klingman, "Weed Control as a Science", John Wiley & Sons, Inc., New York, 1961, pp. 81-96; and J. D. Fryer et al., "Weed Control Handbook", 5th Ed., Blackwell Scientific Publications, Oxford, 1968,

pp. 101-103.

In the following examples of formulations, all parts are by weight unless otherwise indicated.

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EXAMPLE A

Wettable Powder

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tet	rahydro-3-
phenylpyridazine	50%
sodium alkylnaphthalenesulfonate	2%
sodium liginsulfonate	5%
diatomaceous earth	43%

The ingredients are blended, coarsely hammer-milled and then air-milled to produce particles essentially all below 10 microns in diameter. The product is reblended before packaging.

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EXAMPLE B

Granule

Oily active	ingredient	5%
attapulgite	granules	95%
(U.S.S. 2	0-40 mesh; 0.84-0.42 mm)	

An oily active ingredient is sprayed on the surface of attapulgite granules in a double-cone blender. The granules are dried and packaged.

EXAMPLE C

Oil Suspension

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1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetra-hydro-3-phenylpyridazine 25%
polyoxyethylene sorbitol hexaoleate 5%
highly aliphatic hydrocarbon oil 70%

The ingredients are ground together in a sand mill until the solid particles have been reduced to under about 5 microns. The resulting thick suspensions may be applied directly, but preferably after being extended with oils or emulsified in water.

EXAMPLE D

Wettable Powder

	1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tet	ra-
20	hydro-3-phenylpyridazine	209
	sodium alkylnaphthalenesulfonate	4.8
	sodium liginsulfonate	49
	low viscosity methyl cellulose	38
25	attapulgite	698

The ingredients are thoroughly blended. After grinding in a hammer-mill to produce particles essentially all below 100 microns, the material is reblended and sifted through a U.S.S. No. 50 sieve (0.3 mm opening) and packaged.

EXAMPLE E

Low Strength Granule

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine 1%
methylene chloride 9%
attapulgite granule 90%
(U.S.S. 20-40 sieve)

The active ingredient is dissolved in the solvent and the solution is sprayed upon dedusted granules in a double cone blender. After spraying of the solution has been completed, the blender is allowed to run for a short period. The product is then gently dried to remove solvent and the granules are packaged.

EXAMPLE F

Aqueous Suspension

	1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tet.	ra-
5	hydro-3-phenylpyridazine	10%
	polyacrylic acid thickener	0.3%
	dodecylphenol polyethylene glycol	5.0%
10	ether	
	disodium phosphate	1%
	monosodium phosphate	0.5%
	polyvinyl alcohol	1.0%
15	water	82.2%

The ingredients are blended and milled together in a homogenizer to produce particles essentially all under 5 microns in size.

EXAMPLE G

Solution

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1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine 5% water 95%

30 The salt is added directly to the water with stirring to produce the solution, which may then be packaged for use.

EXAMPLE H

Low Strength Granule

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine 0.1% attapulgite granules 99.9% (U.S.S. 20-40 mesh)

(0.3.3. 20-40 mesm)

The active ingredient is dissolved in a solvent and the solution is sprayed upon dedusted granules in a double cone blender. After spraying of the solution has been completed, the material is warmed to evaporate the solvent. The material is allowed to cool and then packaged.

EXAMPLE I

Emulsion Concentrate

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine 35%
blend of polyalcohol carboxylic 6%
esters and oil soluble petroleum
sulfonates
xylene 59%

The ingredients are combined and stirred together to produce a solution. The product can be extended with oils, or emulsified in water.

EXAMPLE J

Emulsifiable Concentrate 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-phenylpyridazine chlorobenzene sorbitan monostearate and polyoxyethylene condensates thereof

The ingredients are combined and stirred to produce a solution which can be emulsified in water for application.

Utility

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The compounds of this invention are useful as plant disease control agents. They provide control of diseases caused by a broad spectrum of fungal plant pathogens in the Basidiomycete, Ascomycete and Oomycete classes. They are effective in controlling a broad spectrum of plant diseases, particularly foliar pathogens of ornamental, vegetable, field, cereal, and fruit crops. These pathogens include, Venturia inaequalis, Cercosporidium personatum, Cercospora arachidicola, Cercospora beticola, Pseudocercosporella herpotrichoides. Erysiphe graminis, Uncinula necatur, Podosphaera leucotricha, Puccinia recondita, Puccinia gramminis, Hemileia vastatrix, Puccinia striiformis, Puccinia arachidis, Pyricularia oryzae, Phytophthora infestans, Plasmopara viticola, Peronospora tabacina, Pseudoperonospora cubensis, Pythium aphanidermatum, Botrytis cinerea, Monlinia fructicola, Alternaria brassicae, Septoria nodorum, and other species closely related to these pathogens. They also control seed pathogens.

The compounds of this invention can be mixed with various fungicides, bactericides, acaricides, nematicides, insecticides or other biologically active compounds in order to achieve desired results with a minimum of expenditure of time, effort and material. Suitable agents of this type are well-known to those skilled in the art. Some of these agents are listed below:

Fungicides

methyl 2-benzimidazolecarbamate (carbendazim)

tetramethylthiuram disulfide (thiuram)

n-dodecyiguanidine acetate (dodine)

manganese ethylenebisdithiocarbamate (maneb)

1,4-dichloro-2,5-dimethoxybenzene (chloroneb)

methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate (benomyl)

2-cyano-N-ethylcarbamoyl-2-methoxylminoacetamide (cymoxanii)

45 N-trichloromethylthlotetrahydrophthalamide (captan)

N-trichloromethylthiophthalimide (folpet)

dimethyl 4,4'-(o-phenylene) bis (3-thioallophanate) (thiophanate-methyl)

2-(thlazol-4-yl)benzimidazole (thlabendazole)

aluminum tris(O-ethylphosphonate)(phosethyl aluminum)

tetrachlorolsophthalonitrile (chlorothalonii)

2,6-dichloro-4-nitroaniline (dichloran)

N-(2,6-dimethylphenyl)-N-(methoxyacetyl)alanine methyl ester (metalaxyl)

cis-N-[1,1,2,2-tetrachloroethyl)thio]cyclohex-4-ene-1,2-dicarbioximide (captafol)

3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidine carboxamide (iprodione)

55 3-(3,5-dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione (vinclozolin) kasugamycin

O-ethyl-S,S-diphenylphosphorodithioate (edifenphos)

4-(3-(4-(1,1-dimethylethyl)phenyl)-2-methyl)propyl-2,6-dimethylmorpholine (fenpropimorph)

4-(3-4(1,1-dimethylethyl)phenyl)-2-methyl)propylpiperidine (fenpropidine) 1-(4-chiorophenoxy)-3,3-dimethyl-1-1H-1,2,4-triazol-1-yl)butanone (triadimeton) 2-(4-chlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-hexanenitrile (myclobutanil) 1-[2-(4-chlorophenyl)ethyl]-1-(1,1-dimethylethyl)-1-(1H-1,2,4-triazole-1-yl)ethanol (tebuconazol) 3-chloro-4-[4-methyl-2-(1H-1,2,4-triazol)-1-ylmethyl)-1,3-dioxolan-2-yl]phenyl-4-chlorophenyl ether (difeno-1-[2-(2,4-dichlorophenyl)pentyl]1H-1,2,4-triazole (penconazole) 2.4'-difluoro-1-(1H-1,2,4-triazole-1-vimethyl)-benzhydryl alcohol (flutriafol) 1-[[[bis(4-fluorophenyl)]methylsilyl]methyl]-1H-1,2,4-triazole (flusilazole) N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]imidazole-1-carboxamide (prochloraz) 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl]-1H-1,2,4-triazole (propiconazole) 1-(2-chlorophenyl)-1-(4-chlorophenyl)-1-(5-pyrimidin)-methanol (fenarimol) 1-(4-Chlorophenoxy)-3,3-dimethyi-1-(1H-1,2,4-triazole-1-yl)butan-2-ol (triadimenol) 1-(2,4-dichlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pentan-3-ol (diclobutrazol) copper oxychloride methyl N-(2,6-dimethylphenyl)-N-(2-furanylcarbonyl)-DL-alaninate (furalaxyl) 1-(4-amino-1,2-dihydro-2-oxopyrimidin-1-yl)-4-[(S)-3-amino-5-(1-methylguanidino)valeramido]-1,2,3,4-tetra deoxy-β-D-erythro-hex-2-enopyranuronic acid (blasticidin-S) 6-(3,5-dichloro-4-methylphenyl)-3(2H)-pyridazinone (diciomezine) O-ethyl-S.S-diphenyl-dithiophosphate (edifenphos) diisopropyl 1,3-dithiolan-2-ylidenemalonate (isoprothiolane) O,O-disopropyl-S-benzyl thiophosphate (iprobenfos) 3'-isopropoxy-2-methylbenzanilide (mepronil) ferric methanearsonate (ferric ammonium salt) (neo-asozin) N-[(4-chlorophenyl)methyl]-N-cyclopentyl-N'-phenylurea (pencycuron) 3-allyloxy-1,2-benzoisothiazole 1,1-dioxide (probenazole) 1,2,5,6-tetrahydro-pyrrolo[3,2,1-ij]quinolin-4-one (pyroquilon) α,α,α-trifluoro-o-toluanilide (flutolanil) 5-methyl-1,2,4-triazole(3,4-b) benzothiazole (tricyclazole) 4,5,6,7-tetrachlorophthalide (tetrachlorophthalide) 1L-(1,3,4/2,6)-2,3-dihydroxy-6-hydroxymethyl-4[(1S, 4R, 5S, 6S)-4,5,6-trihydroxy-3-hydroxymethylcyclohex-2-enylamino]cyclohexyl-ß-D-glucopyranoside (validamy- α,α,α -trifluoro-3'-isopropoxy-2-toluanilide (flutolanil) **Bactericides** tribasic copper sulfate streptomycin sulfate oxytetracycline Acaricides 40 senecioic acid, ester with 2-sec-butyl-4,6-dinitro-phenol (binapacryl) 6-methyl-1,3-dithiolo[2,3-B]quinonolin-2-one (oxythio-quinox) 2,2,2-trichloro-1,1-bis(4-chlorophenyl)ethanol (dicofol) bis(pentachloro-2,4-cyclopentadien-1-yl)(dienochlor) tricyclohexyltin hydroxide (cyhexatin) hexakis(2-methyl-2-phenylpropyl)distannoxane (fenbutin oxide) Nematicides 2-[diethoxyphosphinylimino]-1,3-diethietane (fosthietan) S-methyl-1-(dimethylcarbamoyl)-N-(methylcarbamoyloxy)-thioformimidate (oxamyl) S-methyl-1-carbamoyl-N-(methylcarbamoyloxy)thioformimidate N-isopropylphosphoramidic acid, O-ethyl-O'-[4-(methyl-thio)-m-tolyl]diester (fenamiphos) Insecticides 3-hydroxy-N-methylcrotonamide(dimethylphosphate)ester (monocrotophos)

O-[2,4,5-trichloro-a-(chloromethyl)benzyl]phosphoric acid, O',O'-dimethyl ester (tetrachlorvinphos)

methylcarbamic acid, ester with 2,3-dihydro-2,2-dimethyl-7-benzofuranol (carbofuran)

2-mercaptosuccinic acid, diethyl ester, S-ester with thionophosphoric acid, dimethyl ester (malathion) phosphorothioic acid, O,O-dimethyl, O-p-nitrophenyl ester (methyl parathion) methylcarbamic acid, ester with alpha-naphthol (carbaryl) methyl N-[[(methylamino)carbonyl]oxy]ethanimidothioate (methornyl)

N'-(4-chloro-o-tolyl)-N,N-dimethylformamidine (chlordimeform)

O,O-diethyl-O-(2-isopropyl-4-methyl-6-pyrimidyl)-phosphorothioate (diazinon) octachlorocamphene (toxaphene)

O-ethyl O-p-nitrophenyl phenylphosphonothicate (EPN) cyano(3-phenoxyphenyl)-methyl 4-chloro-alpha-(1methylethyl)benzeneacetate (fenvalerate)

(3-phenoxyphenyi)methyl 3-(2,2-dichloro-ethenyl)-2,2-dimethylcyclopropanecarboxylate (permethrin) dimethyl N,N'-[thiobis(N-methylimmo)carbonyloxy]]-bis[ethanimidothioate] (thiodicarb) phosphorothiolothionic acid, O-ethyl-O-[4-(methyl-thio)phenyl]-S-n-propyl ester (sulprofos) alpha-cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (cypermethrin) cyang(3-phenoxyphenyl)methyl 4-(difluoromethoxy)-alpha-(methyl)benzeneacetate (flucythrinate) O,Odiethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate (chlorpyrifos)

O,O-dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3-(4H)-yl)-methyl]phosphorodithioate (azinphos-methyl)

5,6-dimethyl-2-dimethylamino-4-pyrimidinyl dimethyl carbamate (pirimicarb)

S-(N-formyl-N-methylcarbamoylmethyl)-O,O-dimethyl phosphorodithioate (formothion)

S-2-(ethylthioethyl)-O,O-dimethyl phosphiorothioate (demeton-S-methyl)

(5)-alpha-cyano-3-phenoxybenzyl (1R,3R)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate (delta-

cyano(3-phenoxyphenyl)methyl ester of N-(2-chloro-4-trifluoromethylphenyl)alanine (fluvalinate)

Application Method

Disease control is ordinarily accomplished by applying an effective amount of the compounds of the invention either pre-infection or post-infection to the portion of the plant to be protected such as the roots, stems, foliage, fruit, seeds, tubers or bulbs, or to the media (soil or sand) in which the plants to be protected are growing. The compound also may be applied to the seed to protect the seed and seedling.

Rates of application for these compounds can be influenced by many factors of the environment and should be determined under actual use conditions. Foliage can normally be protected when treated at a rate of from less than 1 g/ha to 5000 g/h of active ingredient. Plants growing in soil treated at a concentration from 0.1 to about 20 kg/ha can be protected from disease. Seed and seedlings can normally be protected when seed is treated at a rate of from 0.1 to 10 g per kilogram of seed. The efficacy of the compounds for disease control is evaluated according to Tests A - F below.

Test A

25

The test compounds are dissolved in acetone in an amount equal to 3 % of the final volume and then suspended at a concentration of 200 ppm in purified water containing 250 ppm of the surfactant Trem 014 (polyhydric alcohol esters). This suspension is sprayed to the point of run-off on wheat seedlings. The following day the seedlings are inoculated with a spore dust of Erysiphe graminis f. sp. tritici, (the causal agent of wheat powdery mildew) and incubated in a growth chamber at 20°C for 7 days, after which disease ratings are made.

Test B

The test compounds are dissolved in acetone in an amount equal to 3 % of the final volume and then suspended at a concentration of 200 ppm in purified water containing 250 ppm of the surfactant Trem 014 (polyhydric alcohol esters). This suspension is sprayed to the point of run-off on wheat seedlings. The following day the seedlings are inoculated with a spore suspension of Puccinia recondita (the causal agent of wheat leaf rust) and incubated in a saturated atmosphere at 20°C for 24 h, and then moved to a growth chamber at 20°C for 6 days, after which disease ratings are made.

Test C

55

The test compounds are dissolved in acetone in an amount equal to 3 % of the final volume and then suspended at a concentration of 200 ppm in purified water containing 250 ppm of the surfactant Trem 014 (polyhydric alcohol esters). This suspension is sprayed to the point of run-off on rice seedlings. The following day

the seedlings are inoculated with a spore suspension of <u>Pyricularia oryzae</u> (the causal agent of rice blast) and incubated in a saturated atmosphere at 27°C for 24 h, and then moved to a growth chamber at 30°C for 5 days, after which disease ratings are made.

5 Test D

Test E

15

The test compounds are dissolved in acetone in an amount equal to 3 % of the final volume and then suspended at a concentration of 200 ppm in purified water containing 250 ppm of the surfactant Trem 014 (polyhydric alcohol esters). This suspension is sprayed to the point of run-off on grape seedlings. The following day the seedlings are inoculated with a spore suspension of Plasmopara viticola (the causal agent of grape downy mildew) and incubated in a saturated atmosphere at 20 C for 24 h, moved to a growth chamber at 20 C for 6 days, and then incubated in a saturated atmosphere at 20 C for 24 h, after which disease ratings are made.

Test F

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The test compounds are dissolved in acetone in an amount equal to 3 % of the final volume and then suspended at a concentration of 200 ppm in purified water containing 250 ppm of the surfactant Trem 014 (polyhydric alcohol esters). This suspension is sprayed to the point of run-off on cucumber seedlings. The following day the seedlings are inoculated with a spore suspension of <u>Botrytis cinerea</u> (the causal agent of gray mold on many crops) and incubated in a saturated atmosphere at 20 C for 48 h, and moved to a growth chamber at 20 C for 5 days, after which disease ratings are made.

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INDEX TABLE A

15	CMPD.			•		
	NO.	R1	\mathbb{R}^2	\mathbb{R}^3	E	mp(°C)a
	1	H	Me	Me	Ph	oil
20	2	Me	H	H	Ph	79-81
	3b	Ph	H	н	Me	114-121
	4	Ph	H	Me	Me	123-124.5
0.5	5	Ph	Me	Me	Н	93.5-94
25	117	н	H	CF3	Ph	124-127
	148	H	н	Me	2-pyridyl	140-146

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a ^{1}H NMR data, given for an oil, are given in Index Table O

b 65% compound plus 35% 3-methyl-4-phenyl-1H-pyrazole

INDEX TABLE B

R18

10						R ³ N	R ⁴	
15						R ¹	E E	
	CMPD.	5 1	R ²	R ³	R4	R ¹⁸	E	mp(°C)a
20	_NO.	В ¹ н	H K-	Me	Me	Н	Ph	127-129
20	7	н Ме	н Н	H	Me	Н	Ph	oil
	8	н	н	н	Me	н	3-CF ₃ -Ph	125-130
	9	н	Н	Н	Me	н	1-naphthalenyl	119-126
25	10	H	н	Me	Me	н	4-C1-Ph	138-143
			н	Me	Me	н	4-F-Ph	155-160
	11	H	н	Me	Me	н	2-Cl-Ph	116-118
30	12	н			Me	н	Ph	142-144
	13	H	H	.H H	Me	н	4-Cl-Ph	179-181
	14	H	H H	н	Me	Н	4-F-Ph	158-165
	15	H	н	ме	Me	Н	Ph	oil
35	16 17	Me н	n H	Me	Me	н	3-CF ₃ -Ph	122-127
	18	н Н	н	Me	Me	н	1-naphthalenyl	199-202
			н	н	н	Н	1-naphthalenyl	152-158
40	20	H			н Ме	н Н	2-C1-Ph	oil
	21	H	H	H		H H		100-105
	22	H	H	H	Me		2-Me-Ph	105-109
	23	H	H	Me	Me	H	2-Me-Ph	
45	24	H	H	H	H	H	4-F-Ph	169-171

a 1H NMR data, given for an oil, are given in Index Table O

50

	CMPD.	•						
	_NQ.	R1	\mathbb{R}^2	\mathbb{R}^3	R4	R18	E .	mp (°C)a
5	25	H	H	H	H	H	Ph .	149-151
Ü	26	н	Н	Me	ме	H	2-furany1	139-141
	27	H	н	H	Me	H	2-furanyl	152 (Dec)
	29	H	н	H	H	Н	2-furanyl	175 (Dec)
10	30	Et	н	H	Me	Н	Ph	oil
	31	Et	н	Me	Me	H	Ph	153-155
	32	Н	н	Ме	Ме	н	2-naphthalenyl	134-137
15	33	н	н	H	Ме	н	2-naphthalenyl	182-184
	34	H	н	Н	Me	H	3-thienyl	90-95
	35	н	н	Me	Me	H.	3-thienyl	150-152
	36	i-Pr	Н	Me	Ме	н	Ph	168-170
20	37	i-Pr	н	H	Me	H	Ph	95-103
	38	H	н	Me .	Ме	Н	2,5-dimethyl-	129-131
							3-thienyl	
25	39	Н	н	Н	ме	н	2,5-dimethyl-	118-122
							3-furanyl	
	40	н	н	н	Me	H	2,5-dimethyl-	119-124
30							3-thienyl	
30	41	H	н	Мe	Me	H	2,5-dimethyl-	111-113
							3-furanyl	
	47	Н	н	Me	Me	H	2-Br-Ph	85-92
35	48	Н	H	Me	Me	H	2- <u>i</u> -PrO-Ph	115-120
	49	н	н	Me	Me	Н	2,5-di-MeO-Ph	154-156
	50	H	Н	Me	Me	H	2,4-diCl-Ph	103-109
40	51	Н	н	Me	Me	н	3-Me-2-thienyl	138-140
	52	H	н	Me	Me	H	3-F-Ph	139-141
	53	H	н	Ме	Me	H	2-fluorenyl	179-183

Dec for mp indicates decomposition.

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a 1H NMR data, given for an oil, are given in Index Table O

	CMPD.	•						
	_NO.	\mathbb{R}^1	\mathbb{R}^2	\mathbb{R}^3	R ⁴	R18	E	mp(°C)a
_	54	H	H	Me	Me	H	2-MeO-Ph	142-150
5	55	Ħ	H	Me	Me	H	3-C1-Ph	144-149
	56	H	H	Me	Me	H	4-Me-Ph	89-92
	57	Ph	H	Me	Me	H	Ph	167-170
10	58	H	H	Me	Me	H	4-Ph-Ph	220
	61	H	н	ме	Me	H	2,4,6-trimethyl-Ph	110-150
	62	Ή	Ph	Me	Me	H	Ph	179-181
15	63	Н	H	Me	Me	H	3-Me-Ph	129-131
	64	Н	H	Me	Me	H	± −Bu	129-131
	65	Н	Н	Me	Me	Н	2-pyridyl	96-105
							(85% pure)	
20	70	H	н	Me	Me	H	4-n-Pr-Ph	90-95
	71	H	H	Me	Me	H	3,4-dimethyl-Ph	145-148
	72	Н	H	Me	Me	H	4-Et-Ph	106-112
25	73	H	H	Me	Me	H	4-cyclohexyl-Ph	164-167
	74	H	H	Me	Me	н	2,4,5-trimethyl-Ph	150-152
	75	H	H	Me	Me	Н	2,4-dimethyl-Ph	109-112
	76	H	Н	Me	Me	H	2,6-di-MeO-Ph	109-125
30	77	H	H	Me ·	Me	H	2,5-dimethyl-Ph	141-143
	78	H	H	Me	Me	H	6-Me-2-naphthalenyl	186-189
	114	H	H	Me	CF ₃	H	4-Cl-Ph	173-175
35	115	H	H	Me	CF ₃	H	Ph	151-152
	116	Н	H	Me	CF ₃	H	4-Me-Ph	gum
	118	H	H	Me	Ph	H	4-Cl-Ph	110-113
40	119	H	H	Me	cyclo-	H	4-C1-Ph	167-169
•					propyl			
	120	H	H	Me	OH	n-Bu	4-C1-Ph	228-231

a lH NMR data, given for oils and gums, are given in Index Table O

50

INDEX TABLE C

R³ R⁴
R² N N
R¹⁶
R⁴

	CMPD.							
20	NO.	R1	R ²	\mathbb{R}^3	R4	R18	E	mp(°C)a
	42	н	H	Me	Me	Н	Ph	94-97
	43	Н	Н	Me	Me	Н	4-F-Ph	90-95
25	44b	H	H	H	Me	H	Ph	oil
20	45	H	н	Н	Me	H	4-F-Ph	134-136
	46	Н	н	Me	Me	H	4-Br-Ph	161-164
	59	н	Н	Me	Me	H	4-OH-Ph	>220°C
30	60	н	н	Me	Me	H	4- <u>t</u> -Bu	105-115°C
	79	н	н	Me	Me	Н	4-Me-Ph	102-104
	80	н	н	Me	Me	H	4-C1-Ph	146-149
35	81	н	H	Me	Me	H	4-MeO-Ph	91-94
	82	н	Н	Ме	Me	H	3,4-dimethyl-Ph	120-121
	86	н	Н	Me	Me	H	4- <u>n</u> -Pr-Ph	103-106
	87	Н	Н	Me	Me	H	4- <u>i</u> -Pr-Ph	90-93
40	88	н	н	Me	Me	н	4- <u>s</u> -Bu-Ph	74-77
	89	H	Н	Me	Me	H	4-Et-Ph	66-71
	90	н	H	Me	Me	н	2,4-dimethyl-Ph	91-93
45	91	н	н	Me	Me	H	4-n-Bu-Ph	55-58

 $a\ ^{1}\mathrm{H}$ NMR data for oils are given in Index Table O.

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b 5:1 ratio of the compound to 4-chlorobutyrophenone.

	CMPD.							
	NO.	R1	R ²	\mathbb{R}^3	R4	R18	E .	mp(°C)a
5	92	н	ОН	Me	Me	H	Ph	153-155
5	93	H	Н	Me	Me	H	4-cyclohexyl-Ph	139-141
	94	н	H	Me	Me	H	2-Me-Ph	90-92
	95	н	Н	Me	Et	н	3,4-dimethyl-Ph	106-110
10	96	н	H	Me	Me	H	4- <u>i</u> -Bu-Ph	76-79
	97	н	H	Me	Me	H	2-tetrahydro-	162-164
							naphthalenyl	
15	98	н	H	Me	Me	H	4-Ph-Ph	169-171
70	99	Н	Н	Me	Me	H	2-indanyl	140-142
	100	н	н	Me	Me	H	4-hexyl-Ph	gum
	101	н	н	Ме	Me	H	3,4-diethyl-Ph	75-80
20	102	H	н	Me	Me	H	4-n-pentyl-Ph	60-63
	103	H	Н	Me	Me	H	4-PhO	152-154
	104	H	H	Me	Me	H	3-Me-4-Et-Ph(50%)	103-106
25							& 3-Et-4-Me-Ph(50%)	
	105	Me	Н	Me	Me	H	Ph	109-111
	106	Et	Н	Ме	Ме	H	Ph .	112-114
	107	н	Н	Ме	Ме	Н	2,5-dimethyl-Ph	gum
30	108	H	Н	Ме	Me	Н	4-(1-(2-C1-	gum
							propyl))-Ph	
	109	н	Н	Me	Me	H	3-C1-Ph	98-100
35	110	Ħ	Н	Me	Me	H	2-thienyl	160-162
	111	Н	Н	Me	Me	H	3,4,5-trimethyl-Ph	154-156
	112	н	н	Me	Me	H	2,5-diethyl-Ph	gum,
40								90% pure
	113	н	MeO	Me	Me	Н	Ph	104-108
	121	H	H	Me	Me	Cl	3,4-dimethyl-Ph	169-173

⁴⁵ a Dec for mp indicates decomposition.

¹H NMR data for oils and gums are in Index Table O.

	CMPD.					-		_
	_NO	\mathbb{R}^1	\mathbb{R}^2	ВЗ	R ⁴	R18	E	mp(°C)a
•	122	H	H	Me	CF3	H	4-C1-Ph -	15.0-152
5	123	H	H	Me	cyclo-	H	4-Cl-Ph	123-126
					propyl			
	124	H	Н	Me	Me	Br .	3,4-dimethyl-Ph	175-179
10	125	H	H	Me	cyclo-	H	4-Me-Ph	gum
					propyl			
	126	H	H	Me	ОН	n-Bu	4-Cl-Ph	171-181
15	127	H	Н	Me	Me	H	3,4-dimethyl-Ph	gum
15	128	H	H	Me	ОН	n-Bu	3,4-dimethyl-Ph	140-155
	129	H	H	Me	i-Bu .	H	3,4-dimethyl-Ph	oil
	130	H	н	Me	<u>i</u> -Bu	H	4-Cl-Ph	136-141
20	131	Н	H	Me	$\mathrm{CH_2CH_2CH_2}$		4-Cl-Ph	181-184
	132	H	Н	Me	Et	H	4-Cl-Ph	95-98
	133	H	Н	Me	cyclo-	H	4-i-Pr-Ph	95-99
25							propyl	
	134	H	Н	Me	<u>i</u> -Pr	H	4-Cl-Ph	96-98
	135	H	Н	Me	cyclo-	H	4-Et-Ph	gum
					propyl			
30	136	н	н	Me ·	MeO	H	4-Cl-Ph	139-143
	137	Н	H	Me	i-Pr	H	3,4-dimethyl-Ph	oil
	138	н	н	Me	cyclo-	H	4-n-Pr-Ph	128-132
35					propyl			
	139	H	Н	Me	Ph	H	4-Cl-Ph	oil,
								70% pure
40	140	H	н	Me	cyclo-	Н	4-MeO-Ph	oil
40					propyl			
	141	H	н	Me	MeO	H	3,4-dimethyl-Ph	145-148

a 1H NMR data for oils and gums are given in Index Table O.

	CMPD.							
	NO.	R1	\mathbb{R}^2	\mathbb{R}^3	R ⁴	R18	E .	mp(°C)a
	142	H	H	Me	Me	Me	4-C1-Ph	161-169
5	143	H	H	Me	Et	H	4-Et-Ph	oil
	144	H	Н	Me	Et	H	4-i-Pr-Ph	oil
	145	H	Н	Me	Et	H	4-MeO-Ph	oil
10	146	H	H	Me	Et	H	4-Me-Ph	oil
	147	Н	H	Me	<u>i</u> -Bu	н .	4-Me-Ph	oil
	159	н	H	Me	Ме	H	2,4-diEt-Ph	48-51
15	160	н	H	Me	Me	H	2-Me-4- <u>t</u> -Bu-Ph	130-133,
19								85% pure
	161	Н	H	Me	Me .	H	3-Me-Ph	128-130
	162	H	н	Me	Me	Н	3-CF ₃ -Ph	86-88
20	163	H	н	Ме	TMS-CH ₂	H	3,4-diMe-Ph	oil
	164	H	н	Et	Et	Н	4-C1-Ph	111-114
	165	Н	Н	Et	Et	Н	3,4-diMe-Ph	oil
25	166	Н	H	Me	i-Pr	н	4- <u>i</u> -Pr-Ph	oil
	167	н	Н	Et	i-Pr	Н	4-Ph-Ph	gum
	168	н	H	Me	<u>i</u> -Pr	H	4-OMe-Ph	oil
	169	н	H	Me	NMe ₂	Н	3,4-diMe-Ph	oil
30	170	H	H	Et .	Et	н	4-OMe-Ph	oil
	171	Н	Н	Me	<u>i-Pr</u>	H	4-Et-Ph	gum
	172	Н	н	Et	Et	н	4-i-Pr-Ph	oil

 $[\]mathbf{1}_{H}$ NMR data for oils and gums are given in Index Table O.

INDEX TABLE D

R⁴
R¹⁸
N

15

	CMPD.					
	NO.	\mathbb{R}^3	R4	R18	E	mp(°C)
20	19	н	H	H	Ph	74-79
	28	н	н	Н	2-furanyl	91-93
	66	Me	Me	CN	Ph	>240
	67	Me	CF ₃	Н	Ph	215-219
25	68	Me	н	H	Ph	120-121
	69	Me	н	н	1-naphthalenyl	85-90

INDEX TABLE E

R¹⁸
N
N
E

45 CMPD. \mathbb{R}^4 \mathbb{R}^{18} mp(°C) \mathbb{R}^3 NO. E CF₃ 75-81 83 H Ph Me CF₃ H 84-90 4-t-Bu-Ph 84 Me 50 82-86 Н H 4-Me-Ph 85 Me

55

30

INDEX TABLE F

5

10

15 CMPD.

NO. E mp(°C) 152 4-C1-Ph 171-180

20

INDEX TABLE G

25

Me N N

35

CMPD.

40	_NO.	E	mp(°C)
	153	3,4-dimethyl-Ph	159-161
45	154	4-Cl-Ph	248-252
	155	4- <u>i</u> -Pr-Ph	136-142
	173	4-MeO-Ph	150-152

50

INDEX TABLE H

R³ N R⁴

10

5

15 CMPD.

NO. R³ R⁴ E mp(°C)^a

156 Cl Cl 4-Cl-Ph 181-185

157 Me Cl

INDEX TABLE I

3,4-dimethyl-Ph oil

30

20

25

R⁴ X N R³

35

40

CMPD.

 \mathbb{R}^{1} \mathbb{R}^2 \mathbb{R}^3 \mathbb{R}^4 X E mp(°C) NO. 45 Н H СН 77-78 150 H н Ph

50

a 1H NMR data for oils are given in Index Table O.

INDEX TABLE J

R⁴ X N R³

15

20

25

CMPD. mp(°C)a \mathbb{R}^2 \mathbb{R}^{3} \mathbb{R}^4 X E \mathbb{R}^1 NO. Ph oil 149 Н Н Me Me

a 1H NMR data for oils are given in Index Table O.

INDEX TABLE K

30

35

R⁴ X N

40

CMPD.

NO. R³ R⁴ X E mp(°C)

151 Me Me N Ph 134-135

50

INDEX TABLE L

R⁴
X
N
N
N
N

10

25

35

45

50

CMPD.

NO. R^3 R^4 X E $mp(^{\circ}C)$ 158 Me Me N Ph 97-98

INDEX TABLE M

R⁴
N
N
R³
N
R²

CMPD.

_NO. R³ R⁴ R²³ E mp(°C)^a

40

174 Me Me H 3,4-diMe-Ph oil

5 .

a $^{1}\mathrm{H}$ NMR data for oils are given in Index Table O.

INDEX TABLE N

Me	R ¹
Me NML _n	
)

15	CMPD.				
	NO.	ML_n	R1	R ²	mp(°C)
	175	ZnCl ₂	H	Cl	231-232
20	176	FeCl ₃	H	Cl	172-173
	177	CuCl ₂	H	Cl	135-138
	178	CuCl ₂	CH ₃	CH ₃	132-133.5
25	179	FeCl ₃	СНз	CH ₃	150-151
	180	MnCl ₂	CH ₃	CH ₃	232-233
	181	ZnCl ₂	CH ₃	CH ₃	250-251
30	182	MgCl ₂	CH ₃	CH ₃	100-101
30					

INDEX TABLE O

5	CMPD.	
	_NO.	1H NMR Dataa
	1	2.56(s, 6H), 2.72(s, 3H), 6.58(s, 1H), 6.95(s, 1H)
40	7	1.34(d, 3H), 2.46(s, 3H), 6.57(d, 1H), 8.33(d, 1H)
10	16	1.4(d, 3H), 2.4(s, 6H), 4.0(dd, 1H), 4.2(dd, 1H),
		6.4(s, 1H)
	21	2.5(s, 3H), 3.5(t, 2H), 4.2(t, 2H), 6.6(d, 1H),
15		8.3(d, 1H)
	30	0.93(t, 3H), 2.4(s, 3H), 6.50(d, 1H), 8.28(d, 1H)
	44	2.11(m, 2H), 2.46(s, 3H), 2.72(t, 2H), 4.8(t, 2H),
		6.60(d, 1H), 7.8(d, 2H), 7.8(d, 2H), 8.40(d, 1H)
20	116	7.75(d, 2H), 7.2(d, 2H), 6.8(s, 1H), 4.2(t, 2H),
		3.35(t, 2H), 2.6(s, 3H), 2.4(s, 3H)
	100	0.88(t, 2H), 1.29(m, 6H), 1.61(m, 2H), 2.15(m,
25		2H), 2.42(s, 6H), 2.62(t, 2H), 2.70(t, 2H),
		4.09(t, 2H), 6.50(s, 1H), 7.18(d, 2H), 7.78(d, 2H)
	107	2.1 (m, 2H), 2.32(s, 3H), 2.38(s, 6H), 2.47(s, 3H),
		2.59(t, 2H), 4.10(t, 2H), 6.47(s, 1H), 7.05(d,
30		1H), 7.16(d, 1H), 7.21(s, 1H)
	108	1.48(d, 3H), 2.10(m, 2H), 2.41(s, 6H), 2.69(t,
		2H), 2.95(dd, 1H), 3.10(dd, 1H), 4.08(t, 2H),
35		4.1 (m, 1H), 6.50 (s, 1H), 7.20 (d, 2H), 7.81 (d, 2H)
	112	1.2(t, 3H), 1.27(t, 3H), 2.11(m, 2H), 2.36(s, 6H),
		2.60(m, 4H), 2.80(q, 2H), 4.10(t, 2H), 6.46(s,
		1H), 7.09(d, 1H), 7.16(s, 1H), 7.17(d, 1H)
40		

 $^{^{\}rm a}$ $^{\rm 1}{\rm H}$ NMR data are in ppm downfield from tetramethylsilane. Couplings are designated by (s)-singlet, (d)-doublet, (dd)-doublet 45 of doublets, (t)-triplet, (q)-quartet, (m)-multiplet. Samples dissolved in CDCl3 unless otherwise indicated.

50

55

	CMPD.	
	NO.	1H NMR Dataa
	125	7.8(d, 2H), 7.4(d, 2H), 6.4(s, 1H), 4.0(m, 2H),
5		2.67(t, 2H), 2.42(s, 3H), 2.35(s, 3H), 2.1(m, 2H),
		1.9(m, 1H), 1.1(m, 2H), 1.0(m, 2H)
	127	7.68(s, 1H), 7.55(m, 1H), 7.15(d, 1H), 6.46(s,
10		1H), 4.01(m, 2H), 2.67(t, 2H), 2.42(s, 3H),
		2.27(2s, 6H), 2.15(m, 2H), 1.90(m, 1H), 1.14(m,
		2H), 1.00(m, 2H)
	129	7.7(s, 1H), 7.55(m, 1H), 7.1(d, 1H), 6.45(s, 1H),
15		4.1(m, 2H), 2.70(t, 2H), 2.50(d, 2H), 2.45(s, 3H),
		2.29(s, 3H), 2.27(s, 3H), 2.0-2.2(m, 3H), 0.95(m,
		6H)
20	135	7.76(d, 2H), 7.22(d, 2H), 6.47(s, 1H), 4.0(m, 2H),
		2.67(m, 4H), 2.41(s, 3H), 2.1(m, 2H), 1.9(m, 1H),
		1.24(t, 3H), 1.1(m, 2H), 0.95(m, 2H)
25	137	7.7(s, 1H), 7.59(m, 2H), 7.10(d, 1H), 6.50(s, 1H),
25		4.1(m, 2H), 2.9(m, 1H), 2.7(t, 2H), 2.45(s, 3H),
		2.30(s, 3H), 2.27(s, 3H), 2.1(m, 2H), 1.28(d, 6H)
	139	8.1(m, 2H), 7.85(m, 2H), 7.85(d, 2H), 7.47(m, 3H),
30		7.36(d, 2H), 7.11(s, 1H), 4.2(m, 2H), 2.7(t, 2H),
		2.56(s, 3H), 2.15(m, 2H)
	140	7.8(d, 2H), 6.9(d, 2H), 6.46(s, 1H), 4.05(m, 2H),
35		3.81(s, 3H), 2.65(t, 2H), 2.41(s, 3H), 2.1(m, 2H),
		1.9(m, 1H), 1.1(m, 2H), 0.95(m, 2H)
	143	7.78(d, 2H), 7.2(d, 2H), 6.5(s, 1H), 4.05(m, 2H),
		2.7(m, 6H), 2.44(s, 3H), 2.15(m, 2H), 1.30(t, 3H),
40		1.24(t, 3H)

a 1H NMR data are in ppm downfield from tetramethylsilane.

Couplings are designated by (s)-singlet, (d)-doublet, (dd)-doublet

of doublets, (t)-triplet, (q)-quartet, (m)-multiplet. Samples

dissolved in CDCl3 unless otherwise indicated.

	CMPD.	
	_NO.	1H NMR Dataa
	125	7.8(d, 2H), 7.4(d, 2H), 6.4(s, 1H), 4.0(m, 2H),
5		2.67(t, 2H), 2.42(s, 3H), 2.35(s, 3H), 2.1(m, 2H),
		1.9(m, 1H), 1.1(m, 2H), 1.0(m, 2H)
	127	7.68(s, 1H), 7.55(m, 1H), 7.15(d, 1H), 6.46(s,
10		1H), 4.01(m, 2H), 2.67(t, 2H), 2.42(s, 3H),
		2.27(2s, 6H), 2.15(m, 2H), 1.90(m, 1H), 1.14(m,
		2H), 1.00(m, 2H)
	129	7.7(s, 1H), 7.55(m, 1H), 7.1(d, 1H), 6.45(s, 1H),
15		4.1(m, 2H), 2.70(t, 2H), 2.50(d, 2H), 2.45(s, 3H),
		2.29(s, 3H), 2.27(s, 3H), 2.0-2.2(m, 3H), 0.95(m,
		6H)
20	135	7.76(d, 2H), 7.22(d, 2H), 6.47(s, 1H), 4.0(m, 2H),
		2.67 (m, 4H), 2.41(s, 3H), 2.1(m, 2H), 1.9(m, 1H),
		1.24(t, 3H), 1.1(m, 2H), 0.95(m, 2H)
25	137	7.7(s, 1H), 7.59(m, 2H), 7.10(d, 1H), 6.50(s, 1H),
23		4.1(m, 2H), 2.9(m, 1H), 2.7(t, 2H), 2.45(s, 3H),
		2.30(s, 3H), 2.27(s, 3H), 2.1(m, 2H), 1.28(d, 6H)
	139	8.1(m, 2H), 7.85(m, 2H), 7.85(d, 2H), 7.47(m, 3H),
30		7.36(d, 2H), 7.11(s, 1H), 4.2(m, 2H), 2.7(t, 2H),
		2.56(s, 3H), 2.15(m, 2H)
	140	7.8(d, 2H), 6.9(d, 2H), 6.46(s, 1H), 4.05(m, 2H),
35		3.81(s, 3H), 2.65(t, 2H), 2.41(s, 3H), 2.1(m, 2H),
		1.9(m, 1H), 1.1(m, 2H), 0.95(m, 2H)
	143	7.78(d, 2H), 7.2(d, 2H), 6.5(s, 1H), 4.05(m, 2H),
		2.7(m, 6H), 2.44(s, 3H), 2.15(m, 2H), 1.30(t, 3H),
40		1.24(t, 3H)

a 1H NMR data are in ppm downfield from tetramethylsilane.

Couplings are designated by (s)-singlet, (d)-doublet, (dd)-doublet of doublets, (t)-triplet, (q)-quartet, (m)-multiplet. Samples dissolved in CDCl3 unless otherwise indicated.

```
CMPD.
             1H NMR Dataa
     NQ.
            7.79(d, 2H), 7.22(d, 2H), 6.50(s, 1H), 4.05(m,
     144
            2H), 2.9(m, 1H), 2.69(m, 4H), 2.43(s, 3H), 2.05(m,
             2H), 1.3(t, 3H), 1.27(d, 6H)
             7.8(d, 2H), 6.9(d, 2H), 6.5(s, 1H), 4.1(m, 2H),
     145
            3.83(s, 3H), 2.68(m, 4H), 2.43(s, 3H), 2.1(m, 2H),
10
             1.30(t, 3H)
            7.76(d, 2H), 7.17(d, 2H), 6.5(s, 1H), 4.10(m, 2H),
     146
            2.68(m, 4H), 2.43(s, 3H), 2.36(s, 3H), 2.10(m,
15
            2H), 1.30(t, 3H)
            7.75(d, 2H), 7.15(d, 2H), 6.5(s, 1H), 4.1(m, 2H),
     147
            2.9 (m, 1H), 2.7 (t, 2H), 2.45 (s, 3H), 2.36 (s, 3H),
20
            2.1 (m, 2H), 1.28 (d, 6H)
            2.60(s, 6H), 6.99(s, 1H), 7.32(m, 2H), 7.46(t,
     149
            2H), 7.84(d, 2H), 8.01(d, 1H)
            2.05(s, 3H), 2.1(m, 2H), 2.32(s, 6H), 3.04(t, 2H),
     157
25
             4.20(t, 2H), 7.23(d, 1H), 7.33(m, 3H)
            7.75(m, 1H), 7.6(m, 1H), 7.1(m, 1H), 6.5(s, 1H),
     163
             4.1 (m, 2H), 2.7 (m, 2H), 2.44 (s, 5H), 2.3 (s, 3H),
30
            2.27(s, 3H), 2.1(m, 2H), 0.15(s, 9H)
            7.7(s, 1H), 7.55(d, 1H), 7.1(d, 1H), 6.51(s, 1H),
     165
            4.1 (m, 2H), 2.70 (m, 6H), 2.30 (s, 3H), 2.27 (s, 3H),
            2.1 (m, 2H), 1.32(t, 6H)
35
            7.8(d, 2H), 7.2(d, 2H), 6.5(s, 1H), 4.1(m, 2H),
     166
            2.9(m, 2H), 2.7(t, 2H), 2.45(s, 3H), 2.1(m, 2H),
            1.27(m, 12H)
40
```

55

a 1H NMR data are in ppm downfield from tetramethylsilane.

Couplings are designated by (s)-singlet, (d)-doublet, (dd)-doublet of doublets, (t)-triplet, (q)-quartet, (m)-multiplet. Samples dissolved in CDCl₃ unless otherwise indicated.

	CMPD.	
	NO.	¹ H NMR Data ^a
5	167	7.95(d, 2H), 7.62(m, 2H), 7.44(m, 2H), 7.30(m,
•		1H), 6.52(m, 1H), 4.10(m, 2H), 2.9(m, 1H), 2.73(t,
		2H), 2.47(s, 3H), 2.15(m, 2H), 1.29(d, 6H)
	168	7.82(d, 2H), 6.90(d, 2H), 6.49(s, 1H), 4.09(m,
10		2H), 3.83(s, 3H), 2.90(m, 1H), 2.68(m, 2H),
		2.45(s, 3H), 2.10(m, 2H), 1.28(d, 6H)
	169	7.7(s, 1H), 7.58(m, 1H), 7.10(d, 1H), 5.85(s, 1H),
15		4.05(m, 2H), 3.12(s, 6H), 2.65(t, 2H), 2.34(s,
		3H), 2.29(s, 3H), 2.26(s, 3H), 2.10(m, 2H)
	170	7.82(d, 2H), 6.90(d, 2H), 6.50(s, 1H), 4.10(m,
		2H), 3.83(s, 3H), 2.7(m, 6H), 2.1(m, 2H), 1.31(t,
20		6H)
	171	7.8(d, 2H), 7.2(d, 2H), 6.5(s, 1H), 4.1(m, 2H),
		2.9(m, 1H), 2.7(m, 4H), 2.45(s, 3H), 2.1(m, 2H),
25		1.28(d, 6H), 1.24(t, 3H)
	172	7.79(d, 2H), 7.22(d, 2H), 6.50(s, 1H), 4.1(m, 2H),
		2.9 (m, 1H), 2.7 (m, 6H), 2.1 (m, 2H), 1.3 (m, 12H)
30	174	7.25(s, 1H), 7.17(m, 2H), 6.4(brS, 1H), 6.22(s,
•		1H), 4.8(m, 1H), 3.7(m, 1H), 3.2(m, 1H), 2.38(s,
		3H), 2.27(s, 9H), 1.9(m, 2H), 1.8(m, 1H), 1.7(m,
		1H)
35		

a 1H NMR data are in ppm downfield from tetramethylsilane.

Couplings are designated by (s)-singlet, (d)-doublet, (dd)-doublet of doublets, (t)-triplet, (q)-quartet, (m)-multiplet. Samples dissolved in CDCl₃ unless otherwise indicated.

Results for Tests A to F are given in Table 1. In the table, a rating of 100 indicates 100% disease control and a rating of 0 indicates no disease control (relative to the carrier sprayed controls). NT indicates that no test was performed.

^{45 (}brS) = broad singlet

TABLE 1

5	Cmpd	Test	Test	Test	Test	Test	Test
Ü	No.	A	B_		D_	E_	F
	1	97	NT	97	0	NT	0
	2	95	97	14	25	47*	0
10	3	0	NT	24	0	NT	0
	4	80	96	7	0	NT	67
	5	98	100	24	0	NT	81
15	6	61	89	7	91	79	96
	7	91	99	27	0	0	0
	8	74	53	. 0	29	90	6
•	9	0	14	67	0	37	45
20	10	61	6 6	0	14	- 26	0
	11	61	62	0	21	9	0
	12	81	87	67	36	80	89
25	13	79	97	0	34	0	0
	14	61	90	16	21	0	46
	15	68	. 73	0	42	0	0
30	16	98	100	0	19	100	89
	17	82	0	0	19	0	0
	18	0	14	0	0	11	0
35	19	63	14	0	0	37	45
	20	0	14	0	0	11	4
	21	86	62	. 0	46	37	0
	22	86	62 .	0	0	11	4

	Cmpd	Test	Test	Test	Test	Test	Test
	No.		B_	C_	D_	E_	F
						•	. · ·
5	23	95	62	97	46	11	94
	24	84	0 .	0	26	48	0
	25	73	49	0	47	48	0
10	26	56	49	0	47	66	0
	27	56	49	0	26	48	0
	28	27	0	0	0	24	0
	29	27	0	0	26	0	0
15	30	98	97	88	62	73	0
	31	90	97	. 95	Q	92	94
	32	83	92	18	44	15	0
20	33	24	16	0	0	39	0
	34	24	16	18	76	100	0
	35	54	62	18	76	15	10
25	36	83	98	88	22	96	0
	37	54	81	74	92	100	0
	38	57	65	84	0	42	97
	39	0	65	0	25	19	0
30	40	28	65	47	47	92	0
	41	0	21	23	0	19	46
	42	96	.99	60	99	35	82
35	43	57	89	61	82	35	89
	44	88	100	16	68	49	94
	45	94	89	84	45	38	69
40	46	60	58	100	0	91	98
40	61	58	89	97	0	96	48
	62	91	93	82	0	37	0
	63	20	53	79	76	100	97
45	64	37	21	30	47	0	0
	65	30	54	0	0	0	18
	66	37	0	0	0	0	. 0
50	67	86	0	0	0	0	0

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	Cmpd	Test	Test	Test	Test	Test	Test
	No.	A	B_		D_	E_	F
	68	0	21	8	21	0	- 0
5	69	11	0	11	0	0	0
	70	75	61	76	75	92	0
	71	32	41	39	47	92	98
10	72	59	86	29	26	58	47
	73	0	41	. 0	0	15	0
	74	11	0	16	0	0	0
	75	41	0	2	92	75	10
15	76	60	27	75	92	0	0
	77	52	46	96	84	42	94
	78	2	19	2	0	0	. 6
20	79	89	100	100	47	91	98
	80	91	100	100	25	91	98
	81	66	98	99	97	75	48
	82	81	98	97	47	97	88
25	83	25	0	10	46	0	0
	84	46	0	0	46	. 0	0
	85	20	0	20	0	21	0
30	86	99	100	99	. 0	100	97
	87	99	100	99	25	99	82
	88	99	99	97	25	100	46
35	89	97	100	99	0	93	97
33	90	98	100	100	46	86	94
	91	98	100	97	0	100	46
	92	71	93	96	0	0	90
40	93	38	0	8	0	85	0
	94	80	41	0	21	20	0
	95	91	98	90	63	63	90
45	96	94	99	90	0	92	69
	97	85	100	90	0	99	90
	98	66	67	90	0	41	. 0
_	99	88	99	91	0	100	99
50							

	Cmpd	Test	Test	Test	Test	Test	Test
	No.	Α	B_	C_	D	E_	F
5	100	63	28	43	NT	. 92	_ 8
	101	95	98	86	NT	100	94
	102	85	96	82	NT	100	0
	103	72	86	90	NT	43	0
10	104	98	100	99	23	100	99
	105	99	100	99	64	92	78
	106	99	100	100	.0	100	96
15	107	100	92	99	82	100	3
	108	98	100	99	70	92	89
	109	84	100	99	53	100	98
20	110	46	67	57	72.	0	68
20	111	71*	44*	86*	NT	77*	NT
	112	99	100	99	57	99	81
	113	95	84	97	37	83	67
25	114	45	27	0	58	100	0
	115	18	97	0	58	0	0
	116	76	66	0	73	42	0
30	117	0	12	0	, 0	19	0
	118	61	12	0	22	0	0
	119	86	61	25	0	19	0
	120	0	24	0	0	0	0
35	121	52	12	92	0	42	0
	122	0	12	0	22	42	0
	123	71	12	95	62	92	0
40	124	41	0	25	0	19	0
	125	62	84	78	0	97	0
	126	0	0	0	0	0	0
45	127	54	9	8	0	100	0
	128	0	24	0	0	0	0
	129	83	64	93	23	97	10
	130	61	25	72	NT	75	. 0
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	Cmpd	Test	Test	Test	Test	Test	Test
	No.	A	B_	C_	D_	E_	E
5	131	61	66	93	NT	97	- 99
	132	100	100	99	NT	100	99
	133	100	99	91	0	100	88
10	134	91	52	91	0	92	93
	135	96	85	80	0	100	88
	136	89	26	32	0	100	88
	137	98	67	91	0	100	93
	138	0	65	14	0	39	62
15	139	26	65	14	0	14	0
	140	97	96	92	Ò	100	96
	141	29	5	0	0	0	3
20	142	46	67	96	37	0	99
	143	98	99	98	37	64	96
	144	98	.100	96	57	64	68
25	145	98	100	99	57	91	94
	146	97	100	93	84	92	. 99
	147	95	100	99	74	92	92
	149	74	79	0	0	0	0
30	150	0 -	24	0	43	0	0
	151	31**	0**	0**	NT	0**	NT
	152	55	22	19	0	37	0
35	153	86	93	90	0	91	95
	154	80	67	84	12	93	98
40	155	73	0	83	0	75	0
	156	0	84	10	0	83	0
40	157	10	0	21	12	0	0
	158	76	11	100	63	21	90

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	Cmpd	Test	Test	Test	Test	Test	Test
	No.	_A_	<u>B</u>		D_	E_	F
	159	96*	85*	90*	NT	28*	- 79
5	160	0	0	8	0	0	0
	161	99	100	99	74	91	99
	162	98	100	99	42	41	93
10	163	92	100	97	84	75	96
	164	82*	64	89*	17	66*	97
	165	31*	85	93	17	88	38*
	166	92*	8*	35*	16	20*	64
15	167	53	0	0	0	18	0
	168	83	99	96	40	92	99
	169	85	0	23	85	91	46
20	170	98	96	99	41	73	99
	171	0***	11***	4***	NT	NT	NT
	172	98	98	90	8	100	0
	173	53	93	61	16	99	99
25	174	99	100	98	73	100	93
	175	31*	8*	89*	40	45*	99
	176	42*	8*	82*	73	27*	99
30	177	36*	93	86*	96	84*	99
	178	33	61	84	92	96	98
	179	85	98	99	74	91	98
35	180	95	100	99	74	96	99
-	181	85	100	100	74	96	99
	182	91	100	99	74	96	94

^{* =} Plants were sprayed at a concentration of 40 ppm.

Claims

A fungicidal compound selected from the group of either Formulae I, II, III, IV, V or VI, including all geometric and stereoisomers, their salts, metal complexes thereof

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^{** =} Plants were sprayed at a concentration of 20 ppm.

^{*** =} Plants were sprayed at a concentration of 10 ppm.

wherein:

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A is 2-pyrimidinyl, 2-pyridyl, 2-quinolinyl, 2-quinazolinyl, 1-isoquinolinyl or 3 isoquinolinyl each optionally substituted with R³, R⁴ and R¹®; or s-triazinyl optionally substituted with R³ and R⁴; provided that R³, R⁴ and R¹® only substitute carbon atoms of the heterocycles;

G is 2-quinazolinyl optionally substituted with R3, R4 and R18;

E is H; halogen; C_1 - C_6 alkyl; C_3 - C_7 cycloalkyl optionally substituted with 1-2 methyl; C_1 - C_6 haloalkyl; C_1 - C_6 alkylthio; C_1 - C_6 alkoxy; C_1 - C_6

haloalkoxy; or phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

n is 1, 2 or 3;

R¹ is H; halogen; cyano; hydroxy, C_1 - C_4 alkoxy, $-OC(=O)R^{19}$, $-OC(=O)NHR^{20}$ C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_6 alkoxyalkyl; C_2 - C_4 alkynyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R⁸ R⁹ and R¹⁰:

R2 is H, cyano, C1-C4 alkyl or C1-C4 haloalkyl;

 R^3 , R^4 and R^{18} are independently halogen; cyano; hydroxy; $(C_1-C_4$ alkyl)₃silylmethyl; phenyl optionally substituted with R^{21} ; C_1-C_6 alkyl; cyclopropyl; C_1-C_6 haloalkyl; C_1-C_6 alkylthio; C_2-C_4 alkenyl; C_2-C_4 alkynyl; C_1-C_4 alkoxy; C_1-C_4 haloalkoxy; C_2-C_4 alkenyloxy; C_2-C_4 alkynyloxy; C_2-C_4 alkoxyalkyl; $NR^{11}R^{12}$; or when R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} or R^4 and R^{18} may together be $-(CH_2)_3-$ or $-(CH_2)_4-$ each optionally substituted with 1-2 methyl;

 R^5 and R^8 are independently halogen; cyano; nitro; hydroxy, hydroxycarbonyl; C_1 - C_6 alkyl; C_3 - C_6 cycloalkyl, C_1 - C_6 haloalkyl; C_1 - C_4 alkylthio; C_1 - C_4 alkylsulfinyl; C_1 - C_4 alkylsulfinyl; C_1 - C_4 alkylsulfinyl; C_2 - C_6 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_4 alkenyl; C_2 - C_4 alkynyl; C_2 - C_4 alkynyl; C_2 - C_4 alkoxysikyl; C_2 - C_5 alkoxycarbonyl; C_2 - C_4 alkoxyalkoxy; C_1 - C_4 alko

R⁶, R⁷, R⁹, R¹⁰, R¹¹, R²¹, R²², and R²⁴ are independently halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy or C₁-C₄ haloalkoxy;

R¹¹, R¹², R¹³, R¹⁴, R¹⁶, R¹⁶ are independently H; C₁-C₂ alkyl; or R¹¹ and R¹², R¹³ and R¹⁴ or R¹⁵ and R¹⁶ can be taken together with the nitrogen to which they attached to form a morpholino, pyrrolidino or piperidino group.

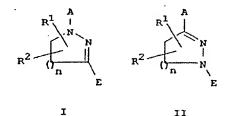
R19 and R25 are H or C1-C3 alkyl;

R²⁰ and R²⁶ are C₁-C₄ alkyl; or phenyl optionally substituted with R²²;

R²³ is H, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₅ alkylcarbonyl, phenylcarbonyl optionally substituted with R²⁴, C₃-C₄ alkenyl, C₃-C₄ alkynyl, phenylmethyl optionally substituted with R²⁴ on the phenyl ring. C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl optionally substituted with R²⁴, phenylsulfonyl optionally substituted with R²⁴, C₂-C₄ alkoxycarbonyl, phenoxycarbonyl option-

ally substituted with R^{24} , $C(=O)NR^{25}R^{26}$, $C(=S)NHR^{26}$ $P(=S)(OR^{26})_2$, $P(=O)(OR^{26})_2$, or $S(=O)_2NR^{25}R^{26}$; provided that

- i) when E is halogen, C₁-C₆ alkyithio, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, phenoxy, phenyithio or phenylamino, then E may only substitute compounds of Formula 1 and III;
- ii) for compounds of Formula I, when A is 2-pyridyl, n is 2, and R^1 and R^2 are H, then E is not phenyl substituted with 1 to 2 fluorine, chlorine, trifluoromethyl, C_1 - C_4 alkyl, C_1 - C_4 alkoxy, or E is not thienyl or furanyl:
- iii) for compounds of Formula III, either E is phenyl, phenoxy, phenylthio, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl, pyridyl each optionally substituted with R⁵, R⁶ and R⁷; or R¹ is phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R⁸, R⁹ and R¹⁰; and R¹ must be in the 4-position;
- iv) for compounds of Formula III, R5 is not NR13R14;
- v) for compounds of Formulae I and II, when n is 1, R¹ and R² do not occupy the 5-position of the pyrazoline ring;
- vi) for compounds of Formula I, when A is s-triazinyl, then R3 or R4 are not NH2;
- vii) for compounds of Formula I, when A is 2-pyridyl optionally substituted with R³, R¹8 and R⁴, and n is 1, then E is not phenylamino optionally substituted with R⁵, R⁵ and R³;
- viii) for compounds of Formulae I and III, when A is 2-pyridyl, n is 1, and R¹ and R² are H, then E is not phenyl, 4-bromophenyl, 4-methoxyphenyl, 4-nitrophenyl or 4-hydroxyphenyl;
- ix) for compounds of Formula II, when n is 3, E is not H or C1-C5 alkyl;
- x) for compounds of Formula II, when n is 1, then E is not H;
- xi) for compounds of Formula I, when n is 1, and A is 6-methoxypyridine, then E is not 4-N,N-diethyla-minophenyl;
- xii) for compounds of Formula II, when A is 2-pyridyl, n is 2, and R^1 and R^2 are H, then E is not C_1 - C_4 alkyl or pyridyl.
- A fungicidal compound selected from the group of either Formulae I or II, including all geometric and stereoisomers, their salts, metal complexes thereof



wherein:

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A is 2-pyrimidinyl or 2-pyridyl, each optionally substituted with R³ and R⁴; or s-triazinyl optionally substituted with R³ and R⁴; provided that R³ and R⁴ only substitute carbon atoms of the heterocycles;

E is H; halogen; C_1 - C_0 alkyl; C_3 - C_7 cycloalkyl optionally substituted with 1-2 methyl; C_1 - C_0 haloalkyl; C_1 - C_0 alkylthio; C_1 - C_0 alkoxy; C_1 - C_0 haloalkoxy; or phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^5 , R^0 and R^7 ;

n is 1, 2 or 3;

 R^1 is H; halogen; cyano; C_1 – C_4 alkyl; C_1 – C_4 haloalkyl; C_2 – C_3 alkylcarbonyl; C_2 – C_4 alkenyl; C_2 – C_6 alkoxyalkyl; C_2 – C_4 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

R2 is H, cyano, C1-C4 alkyl or C1-C4 haloalkyl;

 R^3 and R^4 are independently halogen; cyano; C_1 - C_4 alkyl; cyclopropyl; C_1 - C_4 haloalkyl; C_1 - C_4 alkylthio; C_2 - C_4 alkenyl; C_2 - C_4 alkynyl; C_1 - C_4 alkoxy; C_1 - C_4 haloalkoxy; C_2 - C_4 alkenyloxy; C_2 - C_4 alkynyloxy; C_2 - C_4 alkoxyalkyl; or $NR^{11}R^{12}$;

R⁵ and R⁸ are independently halogen; cyano; nitro; hydroxy, hydroxycarbonyl; C₁-C₄ alkyl; C₁-C₄ haloalkyl; C₁-C₄ alkylthio; C₁-C₄ alkylsulfinyl; C₁-C₄ alkylsulfinyl; C₁-C₄ alkylsulfinyl; C₂-C₄ alkylthio; C₂-C₄ alkylyly; C₂-C₄ alkynyl; C₂-C₄ alkynyl; C₂-C₄ alkynyl; C₂-C₄ alkynyl; C₂-C₄ alkynyl; C₂-C₄ alkynyl; C₂-C₅ alkylcarbonyl;

alkoxyalkyl; C₂-C₅ alkoxycarbonyl; C₂-C₄ alkoxyalkoxy; NR¹³R¹⁴; C(=O)NR¹⁵R¹⁶; or phenyl, phenoxy or phenylthio each optionally substituted with R¹⁷;

 R^6 , R^7 , R^9 , R^{10} and R^{17} are independently halogen, C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, C_1 - C_4 alkoxy or C_1 - C_4 haloalkoxy;

 $R^{11},\,R^{12},\,R^{13},\,R^{14},\,R^{15},\,R^{16}$ are independently H or $C_1\text{--}C_2$ alkyl; provided that

- i) when E is halogen, C₁-C₆ alkylthio, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, phenoxy, phenylthio or phenylamino, then E may only substitute compounds of Formula I;
- ii) for compounds of Formula I, when A is 2-pyridyl, n is 2, and R¹ and R² are H, then E is not phenyl substituted with 1 to 2 fluorine, chlorine, trifluoromethyl, C₁-C₄ alkyl, C₁-C₄ alkoxy, or E is not thienyl or furanyl;
- iii) for compounds of Formulae I and II, when n is 1, R¹ and R² do not occupy the 5-position of the pyrazoline ring;
- iv) for compounds of Formula I, when A is s-triazinyl, then R3 or R4 are not NH2;
- v) for compounds of Formula I, when A is 2-pyridyl optionally substituted with R³, R¹8 and R⁴, and n is 1, then E is not phenylamino optionally substituted with R⁵, R⁵ and R⁻;
- vi) for compounds of Formula I, when A is 2-pyridyl, n is 1, and R¹ and R² are H, then E is not phenyl, 4-bromophenyl, 4-methoxyphenyl, 4-nitrophenyl or 4-hydroxyphenyl;
- vii) for compounds of Formula II, when n is 3, E is not H or C₁-C₅ alkyl;
- viii) for compounds of Formula II, when n is 1, then E is not H;
- ix) for compounds of Formula I, when n is 1, and A is 6-methoxypyridine, then E is not 4-N,N-diethyla-minophenyl;
- x) for compounds of Formula II, when A is 2-pyridyl, n is 2, and R^1 and R^2 are H, then E is not C_1 - C_4 alkyl or pyridyl.
- 3. A Compound of Claim 1 of Formula I or V wherein:

A is 2-pyrimidinyl or 2-quinazolinyl optionally substituted with R3, R4 and R18; and

 R^1 is H; hydroxy, C_1 - C_4 alkoxy, C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkynyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

R³, R⁴ and R¹8 are independently halogen, C₁-C₄ alkyl, cyclopropyl, C₁-C₄ haloalkyl, allyl, C₂-C₃ alkynyl, C₁-C₄ alkoxy or C₁-C₄ haloalkoxy;

R²³ is H, C(=O)NHR²⁶, or C₂-C₄ alkoxycarbonyl; and metal complexes thereof.

- 4. A compound of Claim 3 and metal complexes thereof, wherein:
 - A is 2-pyrimidinyl optionally substituted with R3, R4 and R18;

n is 1 or 2;

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E is phenyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, thienyl, or pyridyl each optionally substituted with R^6 , R^6 and R^7 ;

R1 is H; hydroxy, C₁-C₄ alkoxy, or C₁-C₄ alkyl;

 R^5 is halogen; cyano; C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; allyl; propargyl; C_1 - C_4 alkoxy; C_1 - C_4 haloalkoxy; or phenyl or phenoxy each optionally substituted with R^{17} ; and

R⁶, R⁷, R⁹, R¹⁰ and R¹⁷ are independently H, F, Cl, methyl, trifluoromethyl, methoxy or trifluoromethoxy.

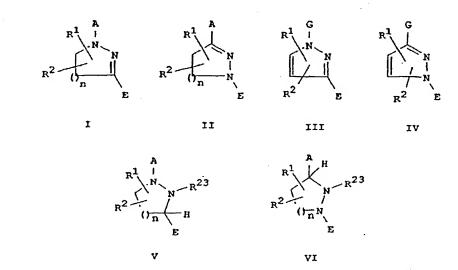
5. A compound of Claim 4 and metal complexes thereof, wherein

E is phenyl, indanyl or tetrahydronaphthalenyl, each optionally substituted with R^5 , R^6 or R^7 ; and R^2 is H or C_1 - C_4 alkyl.

- 6. The compound of Claim 1 selected from the group consisting of
 - 1-(4,6-dimethyl-2-pyrimidinyl)-3-(3,4-dimethylphenyl)-1,4,5,6-tetrahydropyridazine;
 - 1-(4,6-dimethyl-2-pyrimidinyl)-3-(4-ethylphenyl)-1,4,5,6-tetrahydropyridazine;
 - 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-methylphenyl)pyridazine;
 - 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-(1-methylethyl)phenyl)pyridazine;
 - 1-(4,6-dimethyl-2-pyrimidinyl)-4-ethyl-1,4,5,6-tetrahydro-3-phenylpyridazine; and
 - 1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-4-methyl-3-phenylpyridazine.
- 7. A fungicidal composition comprising a fungicidally effective amount of any of the compounds of Claims 1,

2, 3, 4, 5 or 6 and an inert diluent or surfactant.

A method for controlling fungus disease in plants comprising applying to the locus to be protected an effective amount of a compound of Formulae I, II, III, IV, V or VI



wherein:

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A and G are 2-pyrimidinyl, 2-pyridyl, 2-quinolinyl, 2-quinazolinyl, 1-isoquinolinyl or 3 isoquinolinyl each optionally substituted with R³, R⁴ and R¹⁵; or s-triazinyl optionally substituted with R³ and R⁴; provided that R³, R⁴ and R¹⁵ only substitute carbon atoms of the heterocycles;

E is H; halogen; C_1 – C_6 alkyl; C_3 – C_7 cycloalkyl optionally substituted with 1-2 methyl; C_1 – C_6 haloalkyl; C_1 – C_6 alkylthio; C_1 – C_6 alkoxy; C_1 – C_6 haloalkoxy; or phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl,,2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

n is 1, 2 or 3;

 R^1 is H; halogen; cyano; hydroxy, C_1 - C_4 alkoxy, -OC(=O)R¹⁹, -OC(=O)NHR²⁰ C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_6 alkoxyalkyl; C_2 - C_4 alkynyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} :

R2 is H, cyano, C1-C4 alkyl or C1-C4 haloalkyl;

 R^3 , R^4 and R^{18} are independently halogen; cyano; hydroxy; $(C_1-C_4$ alkyl) $_3$ silylmethyl; phenyl optionally substituted with R^{21} ; C_1-C_6 alkyl; cyclopropyl; C_1-C_6 haloalkyl; C_1-C_6 alkylthio; C_2-C_4 alkenyl; C_2-C_4 alkynyl; C_1-C_4 alkoxy; C_1-C_4 haloalkoxy; C_2-C_4 alkenyloxy; C_2-C_4 alkoxyalkyl; $R^{11}R^{12}$; or when R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} substitute adjacent carbon atoms, then R^3 and R^4 , R^3 and R^{18} or R^4 and R^{18} may together be $-(CH_2)_3-$ or $-(CH_2)_4-$ each optionally substituted with 1-2 methyl;

 R^5 and R^8 are independently halogen; cyano; nitro; hydroxy, hydroxycarbonyl; C_1 - C_6 alkyl; C_3 - C_6 cycloalkyl, C_1 - C_6 haloalkyl; C_1 - C_4 alkylthio; C_1 - C_4 alkylsulfinyl; C_1 - C_4 alkylsulfinyl; C_1 - C_4 alkylsulfinyl; C_2 - C_6 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_6 alkoxycarbonyl; C_2 - C_6 alkoxyalkoxy; C_1 - C_4 alkoxyal

 R^6 , R^7 , R^9 , R^{10} , R^{17} , R^{21} , R^{22} , and R^{24} are independently halogen, C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, C_1 - C_4 alkoxy or C_1 - C_4 haloalkoxy;

R¹¹, R¹², R¹³, R¹⁴, R¹⁵, R¹⁶ are independently H; C₁-C₂ alkyl; or R¹¹ and R¹², R¹³ and R¹⁴ or R¹⁵ and R¹⁶ can be taken together with the nitrogen to which they attached to form a morpholino, pyrrolidino or piperidino group.

R¹⁹ and R²⁵ are H or C₁-C₃ alkyl;

R²⁰ and R²⁶ are C₁-C₄ alkyl; or phenyl optionally substituted with R²²;

R²³ is H, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₅ alkylcarbonyl, phenylcarbonyl optionally substituted

with R^{24} , C_3 - C_4 alkenyl, C_3 - C_4 alkynyl, phenylmethyl optionally substituted with R^{24} on the phenyl ring. C_4 - C_4 alkylsulfinyl, C_1 - C_4 alkylsulfinyl, C_1 - C_4 alkylsulfinyl, phenylsulfinyl optionally substituted with R^{24} , phenylsulfonyl optionally substituted with R^{24} , phenylsulfonyl optionally substituted with R^{24} , C_2 - C_4 alkoxycarbonyl, phenoxycarbonyl optionally substituted with R^{24} , $C(=0)NR^{25}R^{26}$, $C(=S)NHR^{26}$ $P(=S)(OR^{26})_2$,

P(=O)(OR28)2, or S(=O)2NR25R28;

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or their agriculturally suitable salts or metal complexes thereof, provided that

i) when E is halogen, C₁-C₆ alkylthio, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, phenoxy, phenylthio or phenylamino, then E may only substitute compounds of Formula I and III;

ii) for compounds of Formula III, either E is phenyl, phenoxy, phenylthio, phenylamino, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl, pyridyl each optionally substituted with R⁵, R⁶ and R⁷; or R¹ is phenyl, benzyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R⁸, R⁹ and R¹⁰; and R¹ must be in the 4-position;

iii) for compounds of Formula I, when E is H, n is 1, R^1 is 5-methyl, and R^2 is H, then A is not s-triazinyl optionally substituted with R^3 and R^4 .

9. A method of Claim 8 employing compounds of Formulae I and V wherein:

A and G are 2-pyrimidinyl or 2-quinazolinyl optionally substituted with R3, R4 and R18; and

 R^1 is H; hydroxy, C_1 - C_4 alkoxy, C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; C_2 - C_3 alkylcarbonyl; C_2 - C_4 alkenyl; C_2 - C_4 alkynyl; C_2 - C_3 alkoxycarbonyl; or phenyl, phenylmethyl, 1-naphthalenyl, 2-naphthalenyl, thienyl, furanyl or pyridyl each optionally substituted with R^8 , R^9 and R^{10} ;

R³, R⁴ and R¹³ are independently halogen, C₁-C₄ alkyl, cyclopropyl, C₁-C₄ haloalkyl, allyl, C₂-C₃ alkynyl, C₁-C₄ alkoxy or C₁-C₄ haloalkoxy;

R²³ is H, C(=O)NHR²⁸, or C₂-C₄ alkoxycarbonyl; and metal complexes thereof.

10. A method according to Claim 9 wherein:

A is 2-pyrimidinyl optionally substituted with R3, R4 and R18;

n is 1 or 2;

E is phenyl, indanyl, tetrahydronaphthalenyl, 1-naphthalenyl, thienyl, or pyridyl each optionally substituted with R^5 , R^6 and R^7 ;

R1 is H; hydroxy, C1-C4 alkoxy, or C1-C4 alkyl;

 R^5 is halogen; cyano; C_1 - C_4 alkyl; C_1 - C_4 haloalkyl; allyl; propargyl; C_1 - C_4 alkoxy; C_1 - C_4 haloalkoxy; or phenoxy each optionally substituted with R^{17} ; and

 R^6 , R^7 , R^9 , R^{10} and R^{17} are independently H, F, Cl, methyl, trifluoromethyl, methoxy or trifluoromethoxy;

and metal complexes thereof.

11. A method according to Claim 10 wherein

E is phenyl, indanyl or tetrahydronaphthalenyl each optionally substituted with R^6 , R^6 and R^7 ; and R^2 is H or C_1 - C_4 alkyl.

12. The method of Claim 11 wherein the compound is selected from the group consisting of

1-(4,6-dimethyl-2-pyrimidinyl)-3-(3,4-dimethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-3-(4-ethylphenyl)-1,4,5,6-tetrahydropyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-methylphenyl)pyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-3-(4-(1-methylethyl)phenyl)pyridazine;

1-(4,6-dimethyl-2-pyrimidinyl)-4-ethyl-1,4,5,6-tetrahydro-3-phenylpyridazine; and

1-(4,6-dimethyl-2-pyrimidinyl)-1,4,5,6-tetrahydro-4-methyl-3-phenylpyridazine.